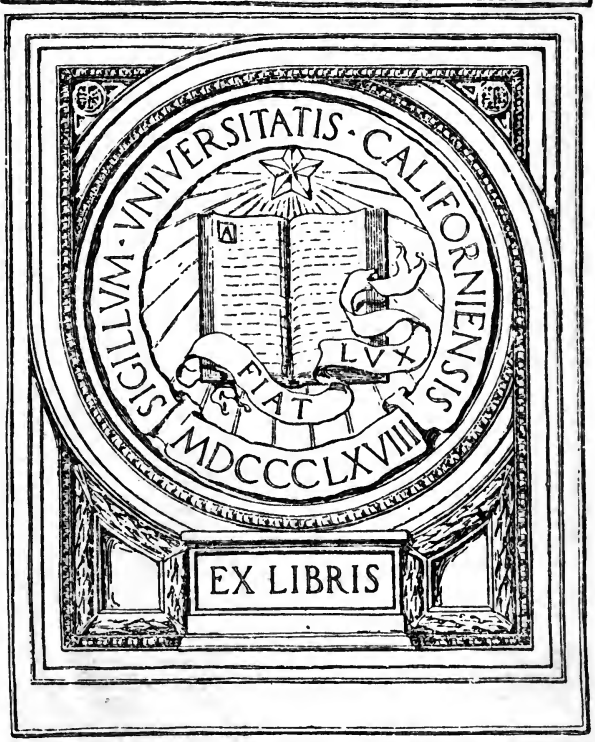
THE COLONIAL EMPIRE OF GREAT BRITAIN

EAST INDIAN COLONIES



Northern India

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THE

COLONIAL EMPIRE

OF

GREAT BRITAIN,

CONSIDERED CHIEFLY WITH REFERENCE TO ITS PHYSICAL GEOGRAPHY AND INDUSTRIAL PRODUCTIONS.

BY

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THE EAST INDIAN GROUP.

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This group includes all the British continental possessions in East India, often styled our Indian Empire, a title to which the immensity of the areas, population, and resources involved, justly entitles them. The group is completed by the island of Ceylon, itself a kingdom in size, value, and former government; and by the outlying and smaller, though important, settlements of Hong-kong, Lábuan, Singapore, Mauritius, and Aden.

CHAPTER I.—INDIA.*

India: General view;—**the Himalayahs**: Ground Plan, Elevation, Snow-line;—**Transverse Valleys**: Sikkim, Changes in Vegetation with Height;—**Longitudinal Valleys**: Nepaul, Kumaon, Hurdwar, Kashmir;—**Outer Ranges** of the Punjab, the Sivalik Hills.

EAST India occupies a vast extent of territory on the southern slope of Asia. It includes the central one of three peninsulas which break the south coast of that continent, together with all the adjacent regions as far north as the crest of the Himalayah Mountains. Westward, it reaches the Solimaun Mountains on the right bank of the River Indus; towards the east, it comprehends the valley of the Brahmaputra to its great bend; and it stretches far to the south along the eastern shores of the Bay of Bengal. The area contained within these limits (but exclusive of the independent state of Bhotan) is equal to 1,377,000

* Dr. J. D. Hooker's 'Journal in the Himalayahs;' Dunlop's 'Hunting in the Himalayahs;' Col. Sir W. Sleeman's 'Journ. in Oude;' Russell's 'Diary in India;' Sir E. Perry's 'Bird's-eye View of India;' 'Geol. Soc. Journ.,' Capt. Vicary on 'Scinde,' 1845 and '6; Capt. R. Strachey on 'Himalayahs,' &c.; and Dr. A. Fleming on 'Punjab Hills,' 1851 and '4; Hunter and Hislop, and Dr. Gilchrist, vol. xi., 1855; Lieut.-Colonel Sykes on the 'Dukhun,' 'Geol. Trans.' vol. iv., New Series: B. Babington, Dr. Adam, 'Geol. Trans.,' vol. v.; Malcolmson on 'Central India,' vol. v., New Series; Purdon and Capt. Austen on 'Kashmir,' 'Geogr. Soc. Journ.,' 1861; Mackay's 'Western India;' Dr. Baikie's 'Neilgherries;' Dr. Royle on 'Indian Products in French Exh., 1855, Reports, part iii.;' Dr. Forbes Watson on 'Fibres of India,' before Soc. of Arts, 1860; Evidence of Col. Turner, Lieut.-Col. Vetch, Captain Haig, Sir J. Lawrence, &c., before Select Com. of H. C. on 'Settlement in India,' 1859; Statistical Papers, &c., relating to India, April 20, 1853; Andrew on 'Punjab Railway;' Offi. Cat. of Intern. Exhib., 1862; Private Information; &c.

square miles, with a population of nearly 175,000,000. The direct rule of Great Britain is exercised over more than one half of this territory, or 762,000 square miles, possessing 125,000,000 of inhabitants; and all the remainder, with the exception of Kashmir, is indirectly subject to the control of the paramount power. The geographical description of the British Empire in the East will, therefore, include that of the whole region above marked out; and since it is obviously impossible to condense an interesting account of this large extent of country within the dimensions of a single chapter, we propose first to take a comprehensive view of its main features, and in succeeding sections to consider some of the more entertaining and characteristic scenes in closer detail.

The extreme length of the northern boundary of this great country measures upwards of 1,700 miles, and the longest line which can be drawn northwards from Cape Comorin is very nearly of the same length. A first glance at the map distinguishes two main divisions of the country, which are roughly separated by the 21st parallel of north latitude. That to the north of this line is a broad piece of the body of the Asiatic continent; its extent in longitude has been already given; its width is much greater towards the west than the east, since a line drawn from the coast of Kattiwar to the northern boundary is fully 1000 miles in length, while a similar line commencing at the Sunderbunds extends little more than 300 miles. The southern division is a rudely triangular area, projecting from the land-mass of the continent, and breaking the uniformity of its outline as if the huge limb of some vast trunk. It decreases in width towards the south, swiftly at first, but afterwards more slowly, the irregularity being due to the varying direction of the eastern coast-line. Thus in the latitude of Surat it is nearly 900 miles across; in the rear of Goa it is reduced to a width of 400 miles, and on the 10th parallel it is only 200 miles. From this latitude it rapidly, but still with uneven pace, diminishes in breadth to the bluntly rounded promontory ending in Cape Comorin.

If now we seek to pass from the consideration of the horizontal outline to the vertical section, a first approximation to the relative heights of the country will be obtained by dividing it into three parts. Speaking thus vaguely, the peninsular portion may be regarded as a mass of high ground, the average elevation of which is 2,500 feet. Then, the northern part of the continental section consists of the vast heights and mountain chains of the Himalayahs; and between these high reliefs lies the third division, comprehending wide and low plains, collectively taking the shape of a huge right-angle, whereof the longer and eastern arm is watered by the river Ganges, and the shorter and western is drained by the Indus.

That feature of the Himalayah Mountains by which they are distinguished from the other great mountain-chains of the world, is the occurrence of habitable valleys upon their flanks, whose greatest length is in the direction of the axis of the chain, and which, in some instances, have an altitude of 5000 feet above the sea. The two subdivisions of the plains below the mountains will be found to present strong points of contrast; for while the Ganges portion overflows with fertility, the largest and most intractable deserts of India are connected with the basin of the Indus; and the climate, the products, and the people of the two river-basins are equally distinct. The southern table-land may also be divided. The main portion of the peninsula is called the Deccan, or "The South." To it is attached, on its north-western side, another and lower plateau named Central India, or the Table-land of Malwa. Moreover, the eastern and western coasts are formed of comparatively flat and low tracts of land, which have been termed the "Concans," from the name of their best-known portion situated to the south of Bombay.

Thus we have obtained three great natural subdivisions of India, viz.:—The Himalayah Mountains and their valleys; the Indo-Gangetic Plains; and the Table-land of the Deccan, with its appendages of Central India and the Concans. Each of these must now receive a more accurate, though still brief description.

The Himalayahs.

It is impossible to consider the mountains termed the Himalayahs apart from the lofty land-masses to the north of them. If the reader will imagine himself walking beneath the sea-wall of one of our watering-places, what to the spectator from above is only a breast-high parapet, is to the passenger below a lofty building. The wall in this example illustrates the position of the Himalayahs; they are the southern edge of the high-ground of Central Asia. So lofty are their summits, indeed, that even seen from the north, they still possess the dimensions of mountains, but their apparent elevation viewed thus, is trifling compared to the stupendous altitudes by which they soar above the plains of India. But although the wall-like character of these mountains is a metaphor often used by travellers to assist the imagination of their readers, it must not be too strictly applied. The enormous forces sufficient to raise the Himalayahs could not act upon any narrow line, and the edge of the upper country is in fact an irregular slope, averaging 100 miles in width, and towards the west is as much as 150 miles across. All this slope from the River Brahmaputra to the Indus is known as the Himalayah Mountains.

Ground-plan.—It is very difficult to arrive at any general notion of the complicated ridges and valleys which are comprehended within this area. The clearest view is that which considers the region around Lake Mansarowar, in lat. 31° north, long. 81° east, as its stand-point. The principal sources of drainage are found here. The lake itself gives rise to the Sutlej: the southern edge of the region contains the head-waters of the Jumna and Ganges, and of the Kalee and Gogra; and on either side of the lake are the sources of the Indus and Brahmaputra, which, after flowing along the northern flank of the main ridge, in opposite directions until they are 1500 miles asunder, break through the mountains into the plains below. This region may also be regarded as the great central mountain-

knot. From it originate four main ranges. Thus, to the south-east is that portion of the Himalayahs which ultimately runs between the valley of Assam and the basin of the upper Brahmaputra; and eastwards, is an unexplored chain to the north of this river: again, to the north-west are the Himalayahs between the River Indus and the plains, and, extending still further northwards, is the Kouenlun, or Karakoram Range.

Thibet is the high country enclosed by these two pairs of ranges. It is loftiest between the western pair, where it is called Little Thibet. The latter is not an elevated plain, as is often supposed, but a series of flat-bottomed valleys, and level terraces between lofty mountain-ranges. And it is so intimately connected with the bounding chains that neither the Himalayahs nor the Kouenlun Mountains have any distinct existence apart from the intervening region. But the subject leads us now to restrict our remarks to the southern branches of the pairs of ranges just indicated.

Seen from below, their appearance is deceptive. A long line of low mountains occupies the foreground, and are covered more or less with forest; while the distant horizon appears filled by a chain of snowy peaks running parallel to the former. Recent explorations in these regions have shown that this view is only partially correct. The whole system may certainly be divided into an outer portion and an inner or upper section; the latter being the true Himalayahs, and the outer mountains receiving the name of the Sivalik Hills. But the water-shed lies far behind the snow-covered peaks, often 100 miles to the rear of them, and this is the proper crest of the range. It passes from east to west with tolerable continuity; and although it seldom contains summits so lofty as the snowy peaks to the south of it, yet its general level is higher than that of the isolated masses among which these occur. In the east it is 17,500 feet high, higher yet in the western division, and many peaks rise out of it to an elevation of 20,000 feet. It is this water-shed which is broken through by the Rivers Indus, Sutlej, and Brahmaputra, when they take a southerly direction. From this, the true axis of

the system, enormous meridional ranges extend towards India, on which are the culminating snowy peaks. The valleys between these meridional ranges are contracted and complicated by lateral spurs from them, and as the latter often overlap each other, they appear at a distance to form a connected east-and-west chain, out of which the snowy summits rise. In some cases the meridional ranges project into the plains, as they do to the south of Sikkim; but more commonly they stop short of, or at least are intercepted by, the outer ranges of the Sivalik Hills. In those instances in which they do not reach the outer ranges, the longitudinal valleys are formed in the intervals, lying upon the flanks of the system as before mentioned. When, on the other hand, the usually continuous outer hills are wanting, their place is supplied by the lateral spurs of the meridional ranges, and the valleys open upon the plains. But even then, because the roads do not follow the intricate and unhealthy river-beds, but always cross the lateral spurs, upon which also the villages are built, we still speak of ascending the wooded outer ranges, as distinct from the region of snow further up the country.

Elevation.—In the Himalayahs are the loftiest peaks in the world: and these are fairly distributed between the eastern and western parts of the system. Thus Chumulari in Bhotan and Donkia in Sikkim are each upwards of 23,000 feet high, and others of still greater elevation are suspected among the unexplored mountains to the north of them. To this group also belongs Kinchinjunga, 28,178 feet high, situated at the north-west corner of Sikkim. And 100 miles nearer to Katmandoo, the capital of Nepaul, is Mount Everest, rising to an altitude of 29,002 feet, and at present the highest measured summit known. Another of the Nepaulese peaks is Dhawalagiri, 26,862 feet high, overhanging the upper Gunduc, near the 83rd meridian. Proceeding westward, among the ranges which ramify from the great central mass into Kumaon and Ghurwal, are Jumnotri and other peaks ranging from 21,000 feet to 25,000 feet in height. And the mountains of the Kashmirian series possess the naked summit of Nanga Parbat, whose height, 26,629 feet,

places it fourth among the loftiest mountains which have been exactly measured.*

The enormous elevation of the system, as a whole, is indicated by the heights of the passes, which are usually carried over the lowest portions of it. These vary in height from 15,000 feet to 18,500 feet. The Nilung Pass, leading from the River Bhagharati to Chaprang on the Thibetan Sutlej, is said to be only 10,150 feet, and fit for horses, but this is quite an exceptional instance. The Neetee Ghât, which is somewhat further eastwards, and opens on the town of Daba in Thibet, is much more frequently alluded to by writers and travellers. This pass is upwards of 16,000 feet high, yet a considerable traffic crosses over it. The mountaineers of the Indian side ascend as the season advances, and during the months of Mar.—Nov. establish "snow villages," so called from being close to the limit of perpetual congelation. There the women cultivate small patches of ground, while the men are engaged in the carrying trade across the ghât. They take over flour, rice, sugar, cotton, &c., in exchange for borax, salt, and wool. In the winter-time they are driven into the lower villages on the Alaknanda River, where they again engage in barter with the traders from the plains below. Their beasts of burden are the yâk, which carries from 150 lbs. to 200 lbs., and the jooboo, a cross between the yâk and the bullock of the hills, and therefore able to descend to the lower villages in winter, which the yâk cannot do: this animal carries from 100 to 150 lbs. Goats and sheep are also much employed, for although 10 lbs. or 15 lbs. is a load, yet they can endure the change of climate experienced in these annual migrations. When the adventurous traders prolong their carrying expeditions till late in the season, they run great risk of being overtaken by the sudden snow-storms which then occur. The unhappy relics of a convoy thus destroyed bestrew the road for months after the passes are again open. Bones of sheep, packages of borax, wool and

* In the Karakoram Range are peaks upwards of 28,000 feet in height, some of which may be found to rival Mt. Everest. 'Geog. Journ.,' 1861.

other goods lie about, it being unlucky to appropriate such property; and the clothes of the unfortunate men are stretched by the way-side for recognition by their friends, since their bodies are burnt as soon as they are discovered. Other dangers arise from snow avalanches and from the frail and ill-repaired bridges over the ravines; so that the amount of merchandise carried across the pass is, all things considered, surprisingly large.*

Snow-line.—Connected with the highest summits is the question, much discussed among meteorologists, respecting the variation of the snow-line upon them. According to the general law which is held to rule the elevation of the line of perpetual snow, it should be found at a diminished height as we recede from the equator. The observed facts seem to point in the other direction. Humboldt gave 13,000 feet as the mean height of the snow-line on the south face of the Himalayahs, and 16,500 feet for that on their northern slopes. He traced the difference to the joint action of the radiation of heat from the elevated plains of Thibet, the serenity of the sky and the non-formation of snow in the dry though cold air; but he demanded more accurate observations. Since the time he wrote, these have been partially made. One of the latest observers of the height of the snow-line is Dr. J. D. Hooker, who distinctly points out that the great region of perpetual snow is found south of the watershed, and upon the highest parts of the meridional ranges. His general conclusion is that the snow-line is commonly lower in the case of any individual mountain on the south side than on the north. "It doubtless lies higher," he says, "in Thibet; but there is less snow, less fog and cloud, and more dry, evaporating winds." The effect of the great masses of snow in cooling the atmosphere and thus lowering the snow-line is very great. The glaciers from the snows of Kinchinjunga, descend in the tortuous gorge of its south face to 15,000 feet above the sea, and no vegetation lives upon the debris deposited by them. But from Kinchinjhow in Thibet, the glaciers only come down to a level of 16,000 feet, and herbs, grasses, and

* Dunlop.

even dwarf rhododendrons grow upon the rubbish cast off by their melting terminations. The lower ends of these glaciers have been too frequently confounded with the lowest limit of perpetual snow, which Dr. Hooker places at from 15,500 feet to 16,000 feet in the Himalayah snowy region. Near the Karakorum Pass, in the mountains of the same name, which has an elevation of 18,500 feet, Dr. Thompson found the snow-line 1500 feet above him, or 20,000 feet high. But observations in Thibet have not yet been made with sufficient accuracy to determine the average elevation of the snow limit in that country. It is known, however, that the facts contradict the general law; and the main causes of the exception are contained in the double statement, that the higher mountains to the south intercept the greater amount of snow and moisture from the prevailing south winds; and that the radiation of heat from the dry and often treeless valleys and flats of Thibet, tends to the more rapid melting of the snow which is deposited, and therefore increases the height of the snow-line.

Sikkim.—One of the best instances of a great lateral valley in the Himalayahs is afforded by the small state of Sikkim. It is about 100 miles in length and 60 miles in width. Two immense meridional ranges separate Sikkim from Bhotan and Nepaul. Upon them, the stupendous peaks of Donkia and Kinchinjunga rise at the northern corners of the country, and a connecting spur divides it from the valley of the River Arun, which breaks through to the westward into Nepaul. In the valley thus defined runs the River Teesta, whose sources are in the Cholamoo Lakes, at a height of 18,500 feet. It runs nearly 90 miles, measured in a right line, before it debouches upon the plains, at a point 350 miles north of Calcutta, though still only 300 feet above the sea. Its principal tributary is the Great Runjeet, which joins it on the right bank before issuing from the mountains. Perched upon the crest of a spur 6000 feet above the last-named stream is the British hill station of Dorjiling, purchased in 1840 from the Rajah of Sikkim for an annuity of 300*l*. It is 7000 feet in absolute elevation; possesses a mean tem-

perature very nearly that of London; and the European children have the ruddy and healthy look of those at home. Since it came into our hands, cultivation has largely increased, especially on the steep slopes of the ridge, which are terraced up by walls for the purpose. As a sanatorium it is so much appreciated that the Government are building barrack accommodation for three or four regiments of English troops, who are to be sent there on their arrival in India; and a railway, or at least a tram-road, is in contemplation, intended to communicate with Calcutta, about 450 miles distant.

The upper part of all such valleys descends much less rapidly than do the central and lower divisions. Thus the bed of the Teesta, for the first third of its length, has only a fall of 60 feet to the mile. Below that, the stream rushes wildly along with a velocity due to an incline of 140 feet per mile. To note the relation of physical phenomena to each other is always interesting. Here, the drier northern mountains do not supply the upper streams with abundant supplies of water, and their beds are not deepened by over-full torrents; but as the rivers pass through the snowy region they receive a large increase from the lofty peaks, their speed increases with their volume, and their already steep course is cut continually deeper, till we find them roaring in the dark bottoms of gorges with all but perpendicular sides 8000 feet, and even 14,000 feet in height. As the Teesta approaches the plains, flat spaces occur by the side of the stream, which are irrigated and produce rice; but the principal part of the cultivation is carried on upon the terraced flanks of the lateral spurs which project on either side. Maize and other crops may be seen growing on a slope of 25°. Rice on the hills requires no irrigation owing to the dampness of the climate. Flax is grown for the sake of its oily seeds. But the production of Sikkim has dwindled under the present bad government to a small fraction of what it was when the Chinese held the country, and cultivated rich crops up to an elevation of 12,000 feet.

Changes of Vegetation.—The changes which the vegetation and aspect of the country undergo with increased

elevation are extremely well marked. As the observer ascends the steep heights which overhang the outer parts of the valley, the atmosphere loses heat but retains much of its dampness. Proceeding inland to the upper valleys, he parts with both heat and moisture. Characteristic alterations accompany these differences. The genial south winds loaded with vapour, and the high degree of temperature in the outer valleys promote a most luxuriant vegetation, wherein tropical features reappear in rich profusion. Palms and bananas, huge fig-trees and gigantic nettles, their allies, peppers and other climbing plants characterise the damp and heat-loving flora of these parts. The sago-palm flourishes by the side of the River Runjeet below Dorjiling, and the India-rubber tree in the forest close by. Bamboos, as thick as a man's thigh, are cut down to make water vessels, and to hold the concrete oil of *Bassia butyracea*. Others scarcely thicker than one's finger, throw their lithe stems above the trees, and are often 100 feet long. These are employed in the construction of perilous-looking bridges which span the ravines. A fig-tree, perhaps, forms the pier on one side, strong piles on the other; two bamboos are tied across, and from them bamboo loops depend which carry a plank. The native carriers, with a load upon their backs, trot along these slight fabrics, unaffected by their frightful swaying motion, across chasms often 80 yards wide, with the leaping, boiling river 40 feet beneath them.

At the height of 4000 feet a distinct change has affected the vegetation. European and even English types occur, but mingled with subtropical forms—figs, succulent nettles, orchids, and ferns. With these are brambles and raspberries, the violet, chickweed, and geranium. Here, too, are maples and birches; and the steep zig-zags wind among noble oaks and chestnuts, walnuts and laurels, while the whole forest is choked with dense underwood produced by the warm dampness of the atmosphere. Again, at Dorjiling, all European vegetables and fruits succeed to perfection. Yet tea is also cultivated, and the delicious mango more than rivals the grape. Higher still, English plants or their congeners are more frequent, though magnolias

form the predominating type. Then come rhododendrons, white and red (the former scented), and these mount to the crest of the hills.

Very different, but equally conspicuous, are the changes which meet the traveller passing up the river-bed towards its source. As the snowy region is neared, the peculiarly tropical plants disappear, and are replaced by deciduous trees. The influence of heat in producing a dense mass of vegetation is no longer manifested, and the forest may be penetrated with ease; the river flows through profoundly deep valleys, and, in the snowy region itself, banks 10,000 feet in height are covered with rhododendrons almost exclusively, so greatly does the moist coolness of the air favour the development of this shrub. Above them is the region of eternal snow. Its lower portions are surpassingly wild, where glaciers gleam amid serried ranges of rusty-red scarped mountains 20,000 feet in altitude. The loftiest peaks are naked, for the vapour-bearing winds scarcely reach so high, and their flanks are, moreover, too steep for snow to lie. All life is there extinct. But on the elevated pass of Donkia, 18,500 feet above the sea, Dr. Hooker found a veritable Scotch lichen, closely akin to the tripe-de-roche of Arctic voyagers. And it is remarkable that these extremely lofty regions give rise to hot springs, which issue near Kinchinjow, in the vicinity of granite. The spot is 16,000 feet high, and the water has a temperature of 116° Fah.

At length the snowy region is left behind, and the upper country gained. Here the valleys are broader and flatter, and do not incline so rapidly. Comparative dryness stamps the character of the scene. At the first view the absence of vegetation seems total. The arid flats and red mountains overwhelm all the other elements of the prospect. The country around the Cholamoo Lakes is the most dreary and inhospitable that can be conceived, combining "the colouring of the fiery desert, or the volcanic island, with the climate of the poles."* Yet here are the chosen pastures of herds of cleanly yâks, which can hardly live at a lower elevation. Among these higher valleys

* Hooker.

are also wild sheep (*Ovis ammon*) as large as a calf, with long legs and enormous horns; two species of deer, and one or two lesser animals. These graze upon a scanty growth of grasses of European genera, with which are intermixed well-known forms of groundsel and buttercups, all nourished by the frequent fogs and drizzling rain driven up from the humid outer regions.

In the corresponding parts of East Nepaul, though at the lower elevation of 13,500 feet, the inhabitants grow wheat and barley, potatoes and turnips, during the summer months in small fields cleared of stones and dyked. The long winter is, however, very severe. The passes are all closed and the soil is everywhere frozen. But the fuel is housed, the crops are stored, and the curd dried (for the yâks are milked till the last blade of grass is concealed), and then the people retire to hybernate in their half-buried houses, where they pass their time in sleep and idleness. The foxes are said to follow their example as far as they can, and take up their abode in the cast-off horns of the gigantic *Ovis ammon*.

Returning to the outer ranges, it only remains to complete this description of Sikkim by casting a hasty glance towards the south. It must be in the winter time, for during the summer Dorjiling and the neighbouring parts are enveloped in mist or drenched with incessant floods of rain. The annual registered rainfall is 120 inches. But when the rains are over, the magnificent panorama of the snowy peaks to the north, filling one-half of the visible horizon, strongly contrasts with the view of the tamer country below. In this direction, long forested ranges, their asperities worn down or hidden by a dark mantle of foliage, separate flat-bottomed valleys equally laden with dense woods. As these ranges sink in elevation they lose their power of arresting moisture, and with that their arboraceous covering; finally, they end in elongated gravelly spurs. To them succeeds the irregular belt of sparse and stunted forest, called the Terai. And beyond this, the distant rivers, reduced to silver threads, meander through the endless plains: and the plains themselves, ocean-like in their flatness, stretch to a limitless horizon,

where the clouds arrange themselves in parallel lines as they do at sea, and the hazy glow is suggestive only of everlasting sunshine.*

Nepaul.—To the west of Sikkim lies the all but independent territory of Nepaul, stretching along the Himalayahs at least 500 miles. Of this country we are informed that its natural resources are numerous and very promising, though but little developed. The western valleys are reported to be extremely fertile and peopled by industrious and thriving inhabitants; but they have never been visited by Europeans. The eastern valleys were entered by Dr. Hooker, with an escort from the Prime Minister and *de facto* ruler, Jung Bahadoor. Here, in the middle regions of the Himalayahs, he found the land carefully cultivated, and the people wealthy, well fed, and well housed. He describes the valleys as being very narrow but often many miles long, with the arable portions extended far up the hill-slopes on either side. The most frequently visited part of the country is the valley, or rather plain, of Katmandoo, so named after the capital city. Itself between 4000 and 5000 feet above the sea, the immediately-surrounding mountains overtop it by an equal height. It is 20 miles long and 16 miles wide, and is one of the most considerable of the longitudinal valleys occurring in the Himalayahs. Near the capital is Shipuri, a mountain 4200 feet higher than the valley. From its top a most commanding view is obtained, which embraces a band of snowy peaks of probably 120° in extent, having Dhawalhagiri and Kinchinjunga at its extremes. The bases of these superb mountains are 25 miles distant; but such is the rarity and clearness of the air that their summits are as distinct as if only a few miles intervened, and their colouring the most delicate and refined imaginable. The lower heights in the foreground are covered with wood, and intersected by ravines through which rush mountain-torrents of the size of rivers. And beneath the observer's feet, is the smiling valley, displaying the richest tropical and sub-tropical cultivation, relieved by large groups of broad-leaved plan-

* Hooker.

tains and the feathery plumes of the bamboo. The well-built capital and other towns and villages indicate the numerous population; and the costly temples, of which the plain is said to contain sixty-four, attest at once the skill of the builders and the wealth devoted to superstition. Sir Erskine Perry believes the Nepaulese to be among the best-lodged people in the world; and much admires the beautiful wood-carving which adorns, not only their temples, but also the doorways and other portions of ordinary houses. Rice is the principal cereal grown in the valley, the dampness of the climate affording abundant means of irrigation; but the soil is rich enough for any crop, and wheat is commonly sown in the cold season. Valuable metallic ores exist, but except in the case of copper, they are turned to very little profit. The Nepaulese carry on a considerable trade with Thibet, which is at least twelve days' journey from Katmandoo. The traders (as to the westward) are generally natives of the higher hills, here called Bhoteas, who bring down Thibetan ponies, shawl-wool, and chemicals, *e.g.*, borax and arsenic, in exchange for wood, rice, tea, sugar, and manufactured goods. These highlanders hurry back to their lofty mountains before the approach of the hot weather, which is to them as pestiferous as the air of the plains is to the inhabitants of Katmandoo. Notwithstanding the extreme jealousy of the English manifested by the Nepaulese Government, our manufactures pass through this country into Thibet, and a large transit trade might be developed if a right of way could be obtained for our goods.

Kumaon. Hurdwar.—The western boundary of Nepaul is the River Kalee, a tributary of the Gogra. Between this stream and the Sutlej is a distance of nearly 300 miles. It is occupied by an extremely rugged country—a gigantic system of ravines and narrow ridges, with occasionally more level spaces. A large portion of it is covered with forests and jungle: and here are some of the most frequented hunting-grounds in India, containing, as they do, the tiger, the wild boar, and the fine samber deer. Adjacent to Nepaul is our province of Kumaon or Kemaon, while the western division is called Ghur-

wal, and is only in part under our direct rule. In the outer hills, near the Sutlej, is the sanatorium of Simla; and lower down, nearer the plain, is the larger town and military station of Umbala, having the former place in full view. Simla is much resorted to by invalids and pleasure-seekers from the plains, especially after the rains, during the months of September and October, which constitute the fashionable season. The snowy Himalayahs are too distant for the forms of particular peaks to be distinguished, but they form a fine line of serrated mountains upon the horizon. The steep hills around the station are very fatiguing; and as there is scarcely a level spot in the neighbourhood, it is impossible for any but those in robust health to move far without riding or driving. This is a disadvantage common to most, if not to all, of our hill stations.

The tract of country under review is interesting, on account of the success which has here attended the cultivation of tea. The plantations are principally situated in two localities. One at an elevation of 4500 feet, in a district of which Almorah is the capital; and the other at a much lower level, in the Deyra Doon, whose chief town is Hurdwar.* This city is situated at the south-eastern corner of the Doon, or valley, and is only 1000 feet above the sea. Bounded on the east and west by the Ganges and the Jumna, and enclosed between the outermost parallels of the Himalayah Mountains, the beautiful valley occupies an undulating country 40 miles long and 16 miles broad. Forest and field vary its surface, the former still predominating. The dense growth upon the low bounding hills; the clear rivers, foaming over their stony beds, so unlike their quiet slimy course in the plains outside; and the giant snow-mountains in the background, present continually changing, though always charming combinations. But the chief life and business of the Doon is concentrated at Hurdwar. Here the Ganges enters upon its course in the plains, escaping from the mountain region through a breach in the Sivalik Hills. At this point, the holy stream attracts thousands of pilgrims. The begin-

* For an account of the Tea cultivation, see below, 'Assam.'

ning of April is the time of the chief festivity, when Hindoos and Bengalees, Sikhs from the Punjab, and Buddhists from Thibet, assemble to worship and bathe in the sacred river. The concourse is also made an occasion of trade, and merchants from all parts—Bengal and Orissa, Affghanistan and Persia—come hither to exchange their wares. Every twelfth year is the Koom Mala, or Great Fair, when the numbers are immensely increased owing to some fanatical procession, which greatly enhances the merit of bathing and its accompanying ceremonies. The last Koom Mala occurred in 1855. The crowds were estimated at nearly three millions of persons, and all the magistracy and police of the district were present to prevent violence or tumult. It requires a strong force to preserve order, and fearful events have occurred in former years. In 1819, the impatient devotees, at the given signal, rushed forward to bathe in such confusion, that no fewer than 430 persons were trampled to death or drowned in the river. The protection of the authorities is also needed for the large amount of merchandize collected at these times. Then, sugar and indigo, spices and drugs are exchanged against shawls, gold-dust, horses and camels from the mountain regions, and a considerable revenue accrues to the British Government from a poll-tax on all who attend the fair.

Kashmir.—Proceeding still to the westward, that part of the Punjab included within the Himalayahs is 500 miles across where least broad. Near the centre of this tract lies the lofty valley of Kashmir. This and the similarly situated valley of Katmandoo, are the most considerable which occur in the higher mountains. Kashmir is, however, by far the larger, being 90 miles long, with a breadth varying from 10 miles to 35 miles. It is, too, completely girdled by lofty mountains from 10,000 feet to nearly 18,000 feet high. The passes are among the loftiest in the Himalayahs, and are all stopped by snow in winter, with the exception of one which follows the course of the River Jhelum. The most frequented is the Pir Punjal pass on the south, which is 11,400 feet in elevation, and though of easy ascent from the valley, is perhaps

the worst in the whole range on the outer side, where the road falls 4900 feet in a horizontal distance of six miles, or about one in six and a half.* Kashmir is drained by the upper Jhelum and its tributaries. The principal source is in the Nesha Lake, 11,250 feet high, situated at the north-eastern corner of the valley. At the other extremity the Jhelum expands into the Wullur Lake, a fine sheet of water ten miles long and five miles wide, which, occupying the lowest part of Kashmir, is still 5189 feet above the sea. In former geological periods, the whole valley has been filled with water, and a deposit of stratified clays, at least 1000 feet thick, was then laid down, and still covers the greater part of the valley. The Jhelum and its affluents have in the course of ages worn down their courses through this deposit to the present level of their beds, and vast quantities of it have been altogether removed; but in some parts the actual river valley is only one or two miles across, and is bounded by these clay strata, which present steep cliffs towards it. The numerous streams from the mountains also intersect and cut these deposits into isolated patches, richly fertile, and producing, among other crops, the saffron for which the valley is noted.

Kashmir is as remarkable for its beautiful scenery as for its productiveness. The villages and houses are intermingled with walnut-trees,—grown for the oil extracted from the nut,—and with orchards of apple and pear trees, and groves of oriental plane and poplars. Dense forests of deodara and other pines cover the uncultivated parts of the alluvial deposits. The mountains are hidden beneath these trees, and oaks, horse-chestnuts and sycamores, with a perfect jungle of undergrowth, up to 11,500 feet high: and then they only change their clothing for one of juniper bushes and rhododendrons. In the lower, hot valleys approaching the Punjab, a beautiful wild olive-tree flourishes, and various kinds of acacia. Adding to the beauty of the natural scenery are the ruins of temples, superbly built of polished and carved marbles, and exhibiting "unmis-

* By Col. Cunninghame's observation. Purdon in 'Geogr. Journ.,' 1861.

takable evidence of the influence of Grecian art." While the romantic glens and secluded valleys are still as attractive as when the great Mogul Jehangir and his empress, the peerless Noor Mahal, spent their summers among them, and poets proclaimed Kashmir a paradise.*

The defile by which the Jhelum leaves the valley is said to be one of the grandest in the world. The lofty mountain chain is cleft to a depth of 7000 feet, and near Uri, at the outer extremity, it is not above 70 feet wide. Through this natural sluice the river rushes with tremendous velocity. For 10 miles from Baramula on the inner side, the water moves rapidly indeed, but with noiseless force as if conscious of an approaching struggle. Then for 15 miles it is a succession of foaming rapids, between almost perpendicular banks, whose dark forests of oaks, planes, and cedars descend to the water's edge, and by their gloom contribute to the horror of the scene.†

The condition of the people is very wretched. When the Sikhs took possession of the country in 1819, the population amounted to 800,000. In 1833, after a succession of desolating earthquakes, famines and years of oppression, they scarcely reckoned 200,000 souls. They are still the finest-formed people of India, but their warlike spirit is broken, and they have acquired the vices of slaves. They retain, however, their ancient pre-eminence in the manufacture of the celebrated Kashmir shawls, of which the following are the chief particulars. They are made of the inner wool or down of the Thibet goat, brought from Kilghet, 20 days' journey to the north-east. One goat furnishes only 2lbs. per annum of this wool, which is of a light grey colour. When carefully picked free from the hairs which are intermixed, it is washed repeatedly in rice-water, and it is thought that some peculiar chemical property of the water in Kashmir,

* Akbar, the father of Jehangir, added Kashmir to the empire of Delhi, A.D. 1586.

† Near the mouth of this defile, it is believed that Alexander defeated Porus. The cedars above named must have supplied the fleet of Nearchus. The British cantonment of Jhelum is on the site of Bucephala; and the district near the river is still called Sikunderabad, the residence of Alexander. Purdon.

acting during this process and that of dyeing, imparts the softness and brilliancy of colour to the shawls which the Punjab manufacturers, with the same workmen and the same wool, find it impossible to imitate. A Kashmir shawl of the finest description, weighing only 7lbs., will sell, on the spot, for as much as 300*l.* This large cost comprises 30*l.* for raw materials, 100*l.* for labour, 50*l.* for miscellaneous expenses, and 70*l.* duty.* Its manufacture probably occupies twelve men for twelve months.

The Outer Ranges.—Hitherto our remarks have been confined to the higher and middle parts of the Himalayahs, except that to complete the account of the Sikkim valley, the appearance of the outer ranges was briefly described. These, however, deserve more attention, since they are the mountains usually seen from the plains. The lofty snow-capped peaks are seldom visible at a distance, being concealed by the clouds of the outer ranges, or by the mists of the flat country below; and when the traveller, is sufficiently close to see through these obscurations the nearer ranges subtend a greater angle at his eye, and completely conceal the more elevated but also more distant summits of the interior. Thus a person passing up the River Ganges may never have a sight of the Himalayahs. At the end of the rainy season, he may obtain a magnificent distant view; but ordinarily, it is the outer ranges which alone are seen—"the hills" as they are termed, while the snowy mountains are invisible until the hills themselves are crossed.

It has been said that these outer ranges take the name of the Sivalik Hills. This is their appellation from the River Sutlej to the valley of Assam. In the Punjab there are several distinct terms given to as many ranges. One common character, however, belongs to the whole length, and differences them broadly from the higher Himalayahs. Geologically, while the latter are composed principally of gneiss with other primary and crystalline rocks, the Sivalik Hills are formed of sandstone, with mica, and occasional beds of clay-slate, and, in lower Bhotan, of coal. Physically, this structural antagonism is manifested

* Official Catalogue. Intern. Exh., 1862.

in their outlines. The difference is partly expressed when we speak of the one section as mountains, and of the other as hills, though hills 10,000 feet high. The former abound in abrupt precipices, profound ravines and mighty cones; the latter are more drawn out and softened in their contour, more monotonous also, and altogether more heavy. These, again, by the dull hues of their vegetable covering, form the most striking contrast with the sparkling lights and fiery tints so conspicuous among the heights of the interior.

Almost everywhere the Sivalik Hills rise out of the plains from a distinctly marked line of junction. If one side of an open book be raised a little, the inclined page may represent the slopes of the hills making a visible angle with the flat one. An important consequence of this is that the rivers of the plains are navigable quite up to the foot of the ranges. The supplies of Dorjiling, for example, are carried nearly all the way from Calcutta by water. It is the same in the Punjab.

In the Punjab, however, are several parallel ridges; the first of which is the Salt Range, varying from 2000 feet to 5000 feet in height. Coming from the west (where bituminous coal is found in it) it crosses the Indus, and extends to the Jhelum. Where the Indus cuts through it, it is but 1800 feet high, and the salt appears in the banks, in layers a foot thick between thin beds of clay. In other parts, these hills are much intersected by defiles, and where the slaty strata are highly inclined, the range is characterized by much ruggedness. The salt is quarried from irregular masses and patches, as if the remains of a vast broken-up bed. Its sale is a Government monopoly, yielding a revenue in 1851 of 14 lacs of rupees (140,000*l.*) per annum. Towards the south-east, between the Jhelum and the Chenab, are some parallel hills upon the plain, wherein are quartz veins loaded with the richest hæmatite, but no iron is at present made from it.

On the north-east, some 60 miles distant, is a second range known as the Murree Hills, 7000 feet high. Beyond them are the Mooshpoora Hills, which probably have an elevation of 10,000 feet. Then we come to the bounding

chains of the Kashmir Valley, 30 miles in width, with peaks of 18,000 feet in height, and finally to the main range of the Himalayah itself. The Murree Hills may be noticed as an illustrative example. Formed of an iron-grey sandstone containing much lime, all the layers of rock dip towards the north-west. Hence, the northern flanks slope gently down towards the valley between them and the next range; while the southern sides are much steeper and composed of a series of terraces upon the edges of the strata, which project from below each other like the tops of a row of books thrown down upon the shelf of a library. With very little assistance from art, these terraces on the strike-edges of the beds are formed into fields. Raised outer banks confine the waters of irrigation, first collected on the upper terraces and then led step by step to fertilize those below. Thus are produced rich crops of rice in autumn, and others of wheat, barley, &c., in the cold weather. The opposite side of the range is clothed with magnificent forests of pines, oaks, horse-chestnuts, and willows, with an under-growth of hawthorns and brambles. And English thoughts are further encouraged by finding the common Solomon's seal, woodruff, and wild strawberry; while in more open spots the green sward is bespangled with white clover, dandelions and buttercups; and among the abundant ferns of the damper parts, the common English braken (*Pteris aquilina*) is frequently met with.* The temperature of these hills is high, being 50° Fahr. at sunrise, and 78° in tents at mid-day, but agreeable to and healthy for European settlers.

The Sivalik Hills.—East of the Sutlej, the outer ranges diminish greatly in height, but still preserve their own characteristics. Where the Sivalik Hills bound the Deyra Doon, they are less than 600 feet above the plain, though 10 miles and 15 miles across; and between the Ganges and the Kalee, they descend to 200 feet and even in some places to 100 feet. But when they form the southern limit of Nepaul, they again rise to the height of mountains. Throughout the whole of this course their super-

* Dr. A. Fleming. 'Geol. Journ.,' 1851.

ficial covering is greatly affected by the comparative want of moisture. In the Punjab there are no hills to the windward to stop the rains; in Sikkim, also, at the other extreme, the vapours from the ocean are borne freely up the mouth of the River Ganges. In the intermediate space, on the contrary, the Rajahmahah and other hills of the Peninsula extract so much moisture from the rain-winds, that a copious fall only occurs again when they come in contact with the lofty, and therefore intensely cold Himalayahs. Hence the Sivalik Hills of the central section do not present the exuberant flora found to the east and west. There is, moreover, little variety of soil, and consequently of vegetation. Seen in an extended view, they exhibit vast inclined plains, with scarcely any forests. Lines of darker green mark the superior growth that fills the valleys in which the rivers flow. The heat is too great for either meadow-grasses or mountain-plants to thrive. A sparse forest crowns their summits, and occasionally straggles down their southern declivities; or some broad slope is covered with an irregular growth of bushes, barely concealing the crumbling rocks. But the instant an exception to the climatic conditions occurs, as where the deeply cut river-beds draw in the moist winds, the most luxuriant forests load the surface. Here are stately pines and fine oaks, with rhododendrons on the colder summits: and near the base are the valuable saul and sissoo trees, (the latter producing a timber resembling rose-wood), and a profusion of orchids and creepers with plantains and sometimes palms, mingling tropical and temperate forms in rich disorder. It often happens, especially to the westward, that the lowest 10 miles of the south slope of the Sivaliks is remarkable for its deficiency in surface-water, the minor streams being there exhausted by the loose gravels and boulders which compose the soil. But as soon as the plains are reached, the drainage of the mountains bursts forth in great abundance, and being unable to run off fast enough by reason of the flatness of the country, the moisture collects and forms a line of swamps and marshes among which is a deformed growth of trees and plants, and the tract is useless from a

superfluity of water. Adjoining this marshy belt are always dense forests, whence are furnished exhaustless supplies of timber and fuel. The whole of this low region at the foot of the hills is called the Terai,* the malaria arising from which is a serious obstruction to free communication between the plains and the mountains.

The general impression conveyed by the narratives of travellers is that a great degree of sameness prevails in the Himalayah Mountains, notwithstanding the paradoxical statement that much variety in detail also exists. In truth, the spectator finds himself in the presence of forms and masses of such vast bulk that the surface covering and animal life of these mountains is apt to be underestimated. The accurate observations of the man of science do indeed disclose an immense array of varied facts; but the inhabitant, and sometimes the visitor, is overwhelmed by the size of the hills, by the extent embraced by the views, and by the wide tracts of country which possess the same conditions of soil and climate, and therefore, similar forms of organic life. Even the hills around Simla, when seen in groups, are so distant that their forests have no individuality, and are likened to a "covering of green velvet." Again, in the snowy regions, the view of several peaks together is only obtained by the sacrifice of all distinctness of detail. Thus, at Dorjiling, the snow-capped summits are from 30 miles to 90 miles distant, when the great Kinchin itself only rises 4° 31′ above the level of the observer, and Donkia, upwards of 23,000 feet in height, makes an angle of but 1° 55′ with the eye. Without instruments it is difficult to appreciate such small quantities at all. Hence the monotony felt among these huge mountains; and thus it comes to pass that while travellers declare their most glowing descriptions to be without exaggeration, we yet have them conceding that for variety and picturesqueness the Himalayahs compare unfavourably with the Alps of Switzerland.†

* Taraee. Off. Catalogue.

† Mr. Elwes makes the same remark with respect to the Andes. They are too large to be seen.

CHAPTER II.—THE INDUS.

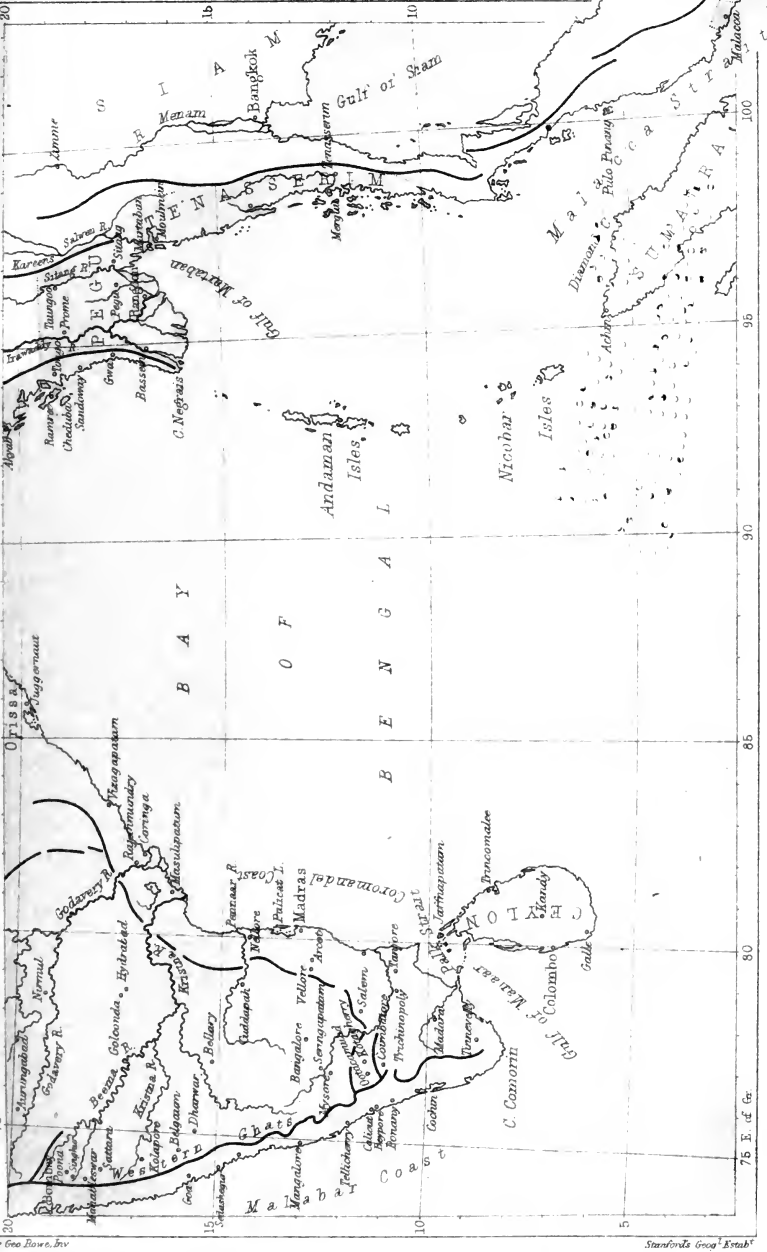
The Indo-Gangetic Plain. **The Indus.** **The Punjab**; Physical Features; Agriculture, Wool, other Industries. **Scinde**; Changes in the Delta; Industry, Kurachee, Effect of improved communications.

The Indus.

The Indo-Gangetic Plain.—The second of the great divisions of India with which we proposed to deal, is the Indo-Gangetic Plain. This is naturally subdivided into two parts, whose longer directions are nearly perpendicular to each other, the vast elbow formed by their junction being turned toward the north-west. In magnitude of elements and apparent uniformity of outline the whole plain strongly resembles the system of the Himalayah Mountains. The highest point in it is scarcely 1200 feet in absolute height, and the traveller may pass up the basin of the Ganges from its mouth in the Bay of Bengal, into the middle of the Punjab, and thence down the Indus to the ocean, a circuit of 2000 miles in length, without rising more than a few hundred feet above the sea. Altogether it contains 500,000 square miles, the larger portion of which overflows with productiveness. The possession of these rich plains has been the aim of the most frequent attacks upon India. Until our own times, the invaders have always entered by the defiles at the north-western corner. By this route came the ancient people who introduced the Sanscrit tongue. The successive invasions of Alexander and his Greeks, of the Afghans and of the Tartars, have followed the same track. But when maritime nations became conquerors, the tide of invasion was reversed, and the English, landing at the south-eastern extremity, marched up the level plain, and

No II.

Southern India



Geo Rowe, Inv

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London. Published by the Socy for promoting Christian Knowledge

by the wealth and influence which its possession gave them, have become by degrees the paramount power of the whole of India.

The Indus.—The basin of the Indus, as far as we are concerned with it, consists of an upper and lower division. The upper is a triangular tract of country, having its broad base resting on the Himalayahs, and gradually narrowing to the point of confluence of the Indus and its chief tributary, the Sutlej. The lower part of the basin is a long narrow region bordering the river, and only widening comparatively at its delta. The total length of the Indus may be estimated in round numbers at 1500 miles; 500 of which are passed in Thibet, and 300 more in breaking through the mountains: it then has a course of 700 miles to the sea; but its windings are so numerous that the actual navigation extends to a much greater length.

The whole of this river-basin is confined on the west by chains of mountains, stretching almost uninterruptedly from the Hindoo-Koosh to the Indian Ocean at Cape Monze. North of lat. 30° these are called the Solimaun Mountains.* South of lat. 28°, and 60 miles to the westward, is the parallel range of the Hala Mountains. The intervening space is a very rugged tract; but it is breached by the Gundava and Bolan passes, through which a traffic is maintained between Shikapoor and the countries to the north-west. Cabul is also reached from Peshawur, through the celebrated Kyber Pass, a defile which opens upon the Cabul River. The Solimaun range, when observed from the Indus, appears to rise from the plains like a wall, forming the watershed of the streams falling to the east and west; but on a closer inspection it is found to resemble the Himalayahs, in that, while its loftiest peaks occur in secondary ranges, the summit line of the drainage, which is that of the greatest mean altitude, lies far to the westward of them. The culminating point of the range is the Tukht-i-Solimaun, the Throne of Solomon, situated on the 70th meridian, opposite the town and cantonments of

* "Solimani Range." Major J. Walter, on 'Trans-Indus Frontier.' 'Geogr. Soc. Journ.,' vol. xxxii., 1862.

Dera Ismael Khan. Its summit is saddle-shaped, forming a narrow plateau five miles long, with a peak at either extremity. The northern of these towers to the height of 11,300 feet above the sea, and that to the south is about 200 feet lower. The Solimaun resembles the Salt Range in being to a great degree destitute of trees, and over large tracts even brushwood is absent. Immediately beneath the hills, and also in the parts adjacent to the Indus, are cultivated tracts; but the country between these districts is a barren alluvial plain. It is beyond the limits of the inundations from the river on the one hand, and is not reached by the scanty permanent drainage of the mountains on the other. During the rains, indeed, hundreds of torrents and streams pouring forth from every ravine, convert it into a sheet of water; but when the season is past, the moisture is soon absorbed by heat and the porous soil. Thus, the Gomul, a river which probably drains an area of 13,000 square miles, dries up in the hot season and fails entirely ere it is half-way across the plains; and none of the other streams do more than supply water to irrigate the land close to the base of the hills. Dwarf bushes of wild caper extend over broad tracts, sharing their dominion with leathery-leaved shrubs of *Salvadora Persica*, which is thought by botanists to be the mustard tree of Holy Scripture.* In other parts are thick crops of *salsola* and kindred plants, the character of which, and of the soil they flourish in, is indicated by the fact that the inhabitants burn them to manufacture a coarse carbonate of soda. Very little rain falls in this arid region itself, and the few wells are often 100 feet and 150 feet deep. In the cultivated parts on either side of this tract, the produce is rich and varied. On the mountain side the torrents are banked up, and the natives plough the irrigated ground behind the bunds, and thus the tillage is carried on in parts it would not naturally reach. The wheat crop is here a precarious one, but the hot-weather crops, such as millet, maize, &c., succeed admirably. And the extension of the corn lands might be indefinitely increased in the now barren region,

* Henfrey's Botany.

under a judicious system of irrigation, and with the aid of the labour that would be attracted by it.

The Punjab.—On the eastern side of the Indus, and between it and the River Sutlej, lie the broad plains of the Punjab. The "five rivers" from which it receives its name, are the Sutlej and its tributary the Beas; and the Chenab, with its affluents the Ravee and the Jhelum. They all rise in the Himalayahs, and have courses of 100 miles and 150 miles among the mountains, before entering the plains. Here, at first, the country is undulating in character, but the low swelling hills quickly subside into an almost perfect level. Such a country is admirably adapted for the formation of canals for irrigation and carriage. The results of their construction are unmistakably good. In the Barree Doab between the Beas and the Ravee, is a canal which issues from the latter river by a cutting 100 feet deep. It has branches to Umritsir and Lahore, and altogether affects a region 200 miles long and 30 miles broad. For the upper half of this length, it passes through a country already well cultivated. Its effects are to enhance largely the crops grown, and to render certain their otherwise doubtful production. But in all the lower portion of the country irrigated no comparison of returns can be made, for the canals have changed a desert into a garden; and this part of the Punjab is now the most prosperous of any. The Jullinger Doab between the Beas and the Sutlej, is also extensively under tillage. The Punjab has an area of 78,000 square miles and a population of 9,000,000; but by far the greater part of the cultivated soil is found in these Doabs, and the people are massed upon them proportionally. There is, therefore, an immense quantity of waste land. Some of this affords a scanty pasture for a stunted race of cattle; and to the west, for a much better breed of horses, which are reared in considerable numbers. But we are told also of thousands of square miles of land whose saline properties offer unusual facilities for the manufacture of saltpetre and carbonate of soda.* Probably,

* Mr. W. P. Andrew, in pamphlet on the Punjab Railway. Evidence before Com. of H. C., 1859.

much even of this is reclaimable; for Sir John Lawrence, after speaking of the great increase of wheat cultivation in the Punjab since our sway commenced, so that this grain sells in harvest time at the rate of 40 lbs. for one shilling, declares himself "afraid to say how much it might be extended." Already it is too plentiful for the price to pay the agriculturist; but when cheap means of conveying it to the coast are available, the cultivation of wheat will again extend itself, and the people of Great Britain may share in the luxuriant harvests of the Punjab. Meanwhile, the cheapness of good food has been one of the most popular advantages of our rule as compared with that of the Sikhs.

Wool, &c.—If the occupiers of the land are not equally benefited with the consumers, in respect of wheat, they have not the same complaint to make as regards wool. The hilly pastures and uncultivated tracts of the northern plains afford sustenance for large flocks of sheep. The price of wool has doubled itself since the British took possession of the country; and the demand increases faster than the supply. The benefit of our occupation is also seen in the increased growth of sugar, indigo, and tobacco. Cotton has been tried on a small scale, and succeeded: but the coldness of the winter makes the plant late in flowering, and the pods are then liable to be hurt by the early frosts; so that much cotton cannot be expected by us from the Punjab. Still, we know that considerable quantities are grown for home consumption, and it is impossible to predict the effect of irrigation upon the waste lands, although writers favourable to the future growth of cotton for export, admit that they are not suited to the crop like the basaltic soils of Central India.* Both flax and hemp, however, may be grown almost without limitation. The native practice has been to grow flax for its oily seeds, and hemp for the resinous substance which exudes from it, named churrus, used as an intoxicating drug. But in 1859 hemp-fibre grown in Kangra on the Sutlej was sent to England, where it was priced at 30*l.* per ton, its value at Lahore being about half that

* See page 101.

sum. Flax, for fibre, is an ancient product of the country near the capital; and under the supervision of the agents of "British Indian Flax Associations" it is probable that the growth will greatly increase. Some flax from the banks of the Beas River, exported to England, sold for 60*l.* per ton in 1857.* Several other most useful fibres may be obtained in abundance, whenever English buyers are sufficiently acquainted with the natives and the resources of the country to purchase with safety. The most noteworthy of these fibres is called Moonj. It is obtained from the outer sheath of a tall grass (*Saccharum Moonja*), and is employed in making tow-lines, well-ropes, and for tying on the buckets of the Persian-wheels used for irrigation; in short, wherever exposure to wet is to be endured, moonj is a most useful material.

The chief manufacture of the Punjab is that of Kashmir shawls. This was introduced by the Kashmir artisans who fled their own country about 30 years ago, upon the occasion of a terrible famine, and settled in Umritsir, Loodiana, and other towns. They follow strictly the methods and even patterns of Kashmir, but seldom compete with the producers of that famous valley. The shawls are either "woven," that is, the pattern is made in many separate pieces, and afterwards sown together so precisely as to appear one piece; or "worked," in which case the pattern is wrought with the needle on a plain shawl-cloth. The former are esteemed the more valuable. The choicest variety of wool is usually retained in Kashmir; and the Punjab looms are supplied from the neighbourhood of Ladak. Some of very fine quality is produced near the village of Rampûr, on the Sutlej, where excellent fabrics are manufactured. Peshawar, also, in the opposite direction, is favourably known for its cloths made of camel's hair, and of that of the Cabul goat.

Carpets are also largely manufactured in the Punjab. These are usually of compound materials: the foundation being made of the common country wool, while the pile is

* Central Committee, Lahore, in Offic. Cat. for India. Intern. Exh., 1862.

formed of a finer kind, sometimes even of the "pashum" or Kashmir shawl-wool; and occasionally of silk. Much taste and ingenuity are displayed in the production of these carpets; and several were sent to the International Exhibition of 1862, which derived additional interest from their having been made by Thugs and their families, who after turning approvers against their fellow-murderers, are now in safe keeping in the principal jails. Mooltan, Lahore, Umritsir, and Peshawur, are all famous for their excellent carpets; the first-named place producing the most esteemed. Among the minor industrial occupations of the Punjab, may be included the manufacture of alum, which is principally made at Kala-Bagh, on the River Indus, near the Salt Range. The raw material is a black shale, and the process almost identical with that employed in England. Saltpetre is produced in larger quantities, especially about Mooltan and in the southern districts. Here also may be mentioned the peculiar ornamentation of steel articles by inlaying with gold, known as "koftgari." It was formerly much employed for adorning armour and weapons, but is now restricted to more peaceful uses, such as decorating caskets, jewel-boxes, &c.

Upon the whole, it is clear that the manufactures of this country are open to great improvement. That of cotton-goods will probably yield to the cheaper fabrics supplied by Manchester. But all the others will be advanced, and new ones arise, as the results of our government become more decided; and, perhaps, above all things, as we provide cheap and ready means of access to every district by rail-way, road, or canal. This is at present the most urgent want of the Punjab. "We are perishing," says Sir J. Lawrence, "for want of roads in the plains."

Scinde.—The lower division of the basin of the Indus is occupied by the province of Scinde, annexed by the English in 1845. It is a long and narrow tract lying between the mountains and the Thur, or Desert. 63,000 square miles in extent, its surface is scarcely ruffled by a hill; and the large proportion of waste land is indicated by the paucity of inhabitants, which according to the last

official Census numbered only 1,768,000 persons.* The principal towns are Shikarpoor and Hydrabad, both on the Indus, and Kurachee near the extreme western point of the coast. Tattah, a few miles above the commencement of the western subdivision of the Delta, is also a place of importance.

Upon leaving the Punjab, the Indus is a noble stream, 2000 yards wide, and 24 feet deep. Where it passes Hydrabad it has decreased to a breadth of 680 yards, but is 30 feet in depth. The streams of the Delta are occasionally 1000 yards across, though much encumbered with sandbanks. These, and the rapid course of the stream, are the chief obstacles to the navigation of the Indus.

Changes in the Delta.—This river affords a good illustration of the physical law respecting "the movement of rivers in latitude." All rivers having a north and south direction, but especially those in low latitudes, show a tendency to shift their courses, either to the east or west. Such as run towards the equator tend to wear down their western banks; and, on the contrary, those moving from the equator abrade their eastern shores. From the same tendency it happens that, where the rivers have deltas, the branches on one side are liable to become shallow and dry up, while those on the other are surcharged with water, and new branches thrown out. The probable cause of these changes is the action of the earth's diurnal motion upon the mobile fluid, urging it out of its meridional, into a diagonal course, in the same manner as the directions of the normal winds are influenced. It appears to be a confirmation of this conjecture, that, in the case of rivers having an east and west course, by far the greater number of deltas are found at the mouths of those running towards the east, that is, in the same direction as the diurnal motion of the earth, the high velocity of which has a tendency to check the apparent motion of such rivers, and to accelerate those moving in the opposite direction.

* Col. H. B. Turner, late Engineer officer in Scinde, gave these numbers as 40,000 square miles, and 3,000,000 inhabitants. Evidence before Com. of H. C., Feb., 1859.

In agreement with the law just explained, the eastern streams of the Indus-delta are uncertain in their depth and quantity of water, and are dependent upon accidents of rainfall and slight alterations of level caused by earthquakes. But the rivers to the west bring down full streams, and new branches occasionally fill, to become hereafter permanent. It is, in fact, suggested by one writer that the Indus at some former time debouched at the Gulf of Cutch, and has formed the great desert by its recession to the westward.* On a smaller scale, a similar effect has been caused by the movement of the Ganges-delta; and the supposition is moreover useful by fixing in the memory the relative positions of the physical features of the country, for the desert region is in each case to the east of the delta. During the floods, the inundations cover the banks, which are thus softened at the same time that the greatest removing power is applied to them. The streams often cut for themselves new courses in a single season; and the tendency of all those of this delta and that of the Ganges is to wear away their right or western boundaries. Looking to the future, and reasoning from the past, it is altogether possible that Kurachee may be hereafter situated on a main mouth of the Indus.

The present appearance of Scinde is very unpromising. The Hala Mountains on the west are often bare of trees, and being only about 2000 feet in height,† do not, like the loftier Solimaun ranges, send down sufficient water to fertilize the land below. The eastern limits of the country are more discouraging still. The poverty of production increases as the traveller leaves the river until the confines of the desert are reached. And over the latter numerous lines of low sandy hills are scattered, producing scanty vegetation only during the rains. In the dry season, their loosely cohering masses are at the mercy of the wind, which effects great changes among them. The soil of the lower ground between them is, however, sometimes ameliorated by a mixture of clay, and then

* Lieut.-Col. Hamilton Smith. 'Nat. Hist. of the Human Species.'

† Their highest point is 3500 ft. Capt. Vicary on 'Scinde.' 'Geol. Journ.,' 1846.

a species of coarse grass lives long enough to support a small number of camels and sheep. Towards the Aravulli Hills such oases grow larger and more frequent; but the only cultivated spot in the centre of the desert is that around Jessulmeer. Near the Indus itself the most prominent feature is the dense thickets of small brushwood which line the low banks of the streams, among which saline plants and the all-pervading tamarisk predominate.

Industry of Scinde.—To an observer unacquainted with the changes in the appearance of a tropical country brought about by culture, the condition of this province would appear hopeless. But good authorities inform us that almost the whole country may become highly productive under proper treatment. The means agreed upon are "improved irrigation and cheapening the cost of transit." With regard to the former of these, the Indus lends itself in a most advantageous manner to all schemes for irrigation. It is well known that rivers running for long periods through tracts periodically inundated by their waters gradually elevate their banks till they flow along the highest ridges of the country.* The increase of height, in the instance before us, though not more than a few feet, is quite ample for giving a fall to the water in the irrigation canals cut from the river. This circumstance materially lessens the cost of such works. Ancient canals still exist in certain parts of the country, and many which had fallen into decay have been reopened by our Government, with the most happy results. To show what can be done in this way, the following case, cited by Colonel Turner, may be noticed. On the eastern side of the Indus is one of the deserted stream-beds above alluded to, called the Nara. For 26 years no water had passed down it. For five years a cutting to the river near the upper part of it had been in formation, which when complete would let in the water again to all the valley—250 miles long, and from six to eight miles wide. The land so watered may be further enlarged by

* Thus, the River Po has so raised its bed, that near Ferrara the bottom of it is higher than the tops of the campaniles in that city.

canals from the Nara. In this manner, it is asserted, the cultivated tracts may be ultimately carried eastward from the delta as far as the Runn of Cutch, and (in Upper Scinde) to the very borders of the desert. By such measures, the products of the country will be increased manifold. Wheat (in the cold season) and other grains, oil seeds of various kinds, as linseed and sesamum, will be the first crops improved by them. The sugar-cane is already grown to a large extent, but will have an increased production; and indigo, now a wild plant, will probably be much cultivated. Of the great fertility of the irrigated part of Scinde, there can be no doubt. The common grains, the jowar (*Sorghum vulgare*) and several varieties of millet, are represented as unsurpassable in luxuriant growth. An immense quantity of flax might be produced, its cultivation having been tried with success. Cotton does not seem to find here a congenial habitat. There are no frosts as in the Punjab; but there is too much moisture in the air, falling in extremely heavy dews, so that the pods are apt to rot before the cotton is matured. Other useful fibres exist, however, in abundance, *e. g.*, the Sunn hemp (*Crotalaria juncea*). As a raw material only requiring to be collected, we may also instance the small gall formed on the Tamarisk, which is an excellent tanning substance, and might be exported with profit.

Kurachee.—Before the large resources of the country can be fairly developed, there must also be the means of transporting the articles of production to a suitable market. With such a fine river as the Indus appears upon a map, and in many points really is, there would seem to be a great highway ready made through the whole of Scinde. But unfortunately this highway has no proper outlet. It is both dangerous and uncertain. A vessel drawing only eight feet of water, would run aground in the attempt to enter. The small native boats cannot face the stormy waters of the broad reaches of the delta in a gale of wind, and can only make the passage up during the most favourable state of the river, and then with great labour and waste of time.

The first object, then, is to secure a good outlet for the trade, and afterwards to find the means of bringing the commodities to it. Such an outlet is found in Kurachee. Nature has done little for this place beyond leaving it without a rival. It is the only port north of Bombay to which sea-going vessels can repair. But Kurachee is surrounded by a flat and bare district out of which rise numerous low hills, not 200 feet in height, like islands from a sea. Even wood for fuel and grass for the cattle have to be conveyed to the town from the river, 50 miles distant. It is beyond the usual limit of the monsoon rains, which occur only once in four or five years. Yet, counterbalancing all its disadvantages, there are the facts that it is healthy for Europeans, and possesses a harbour. Hence the exigencies of our commerce have converted Kurachee into a populous and important sea-port, having already an external business of 2,250,000*l.* about equally divided between imports and exports. It is true, a bar at the entrance had only 16 feet of water upon it, and its presence was causing a pernicious deposit of sand in the harbour itself; but when the improvements in hand are finished, vessels drawing 26 feet will be able to enter at all seasons, and the tidal waters are expected to scour the basin clear of all accumulations of sand. A fine sandstone cliff to the eastward, now five miles inland, but eroded by the sea, and drilled by saxicavous mollusks, certainly suggests the extent to which the ancient shore-line has advanced in this neighbourhood; but we have met with no proof that this advance continues at the present time; and on the other hand a low coast is not favourable to attacks by the ocean. Neither by encroachments of land or sea, therefore, does the future prosperity of Kurachee appear to be threatened.

Effects of improved Routes.—This place is probably destined to become the commercial Calcutta of the Indus. The main lines of communication are to converge upon it. All the imports and exports of the Punjab and Scinde will pass through it, and it is not unreasonably expected that the trade of the upper Ganges will also be diverted towards it.

Since the streams of the Indus-delta are impracticable

for the purposes of commerce, it is intended to carry a line of railway from Kurachee to Kotree upon the right bank of the river opposite to Hydrabad. This is a distance of 120 miles. From this point the main line of transit is to be on the river. With all the difficulties attending the navigation of the Indus duly taken into account, it is found that steamboats drawing not more than $3\frac{1}{2}$ feet of water may always ascend to Mooltan, on the Chenab, 570 miles above Kotree. Mooltan is the southernmost station of the projected Punjab Railroad, of which the section joining Umritsir with the capital is already in operation. About 240 miles of this road remain to be completed. Umritsir and Shikarpoor, the commercial centres of the Punjab and Scinde, and Lahore and Hydrabad, the political capitals, will be thus placed in easy communication with each other and with Kurachee. It is proposed to carry branches of this trunk line from Lahore to Peshawar for the convenience of the Cabul traffic; and also from Shikarpoor to the entrances of the Gundava and Bolan Passes. But these railways must meet with engineering difficulties expensive to be overcome; while the main line should be remarkably cheap in its formation from the level and unbroken nature of the country.* The latter road will probably be carried to Shikarpoor and possibly to Mooltan before the former are undertaken.

The least complete of these plans will be an unspeakable boon to the country, increasing its products by supplying a market, developing its external trade, and as a consequence improving the material comforts of the people. Combined with comprehensive schemes of irrigation, the result must be so great an advance in trade, as to affect that of Great Britain. The exportable articles of the Punjab and Scinde are valuable to us; such are their wheat and oil, their flax and wool, their dyes, and tanning materials. The shawls of Kashmir and the silk of Bokhara may also be expected to reach us from the great northern emporium of Umritsir. With respect to their imports, our manufactures will meet with a large

* Coal, abundant and good, is said to be found within thirty miles of Kotree. W. P. Andrew on 'Punjab Railway.'

demand, growing with the prosperity of the country. The first thing an agriculturist does with an improved income is to clothe himself in English calico; and the means of gratifying this taste will increase it. Shikarpoor might be supplied with our goods more cheaply than it is now with Russian manufactures. These are brought by a long overland carriage, ending with the caravan-routes through the passes. If Russia can sell her furs and silks, woollen and cotton cloths and hardware at a profit, it is to be expected that England will do no less with the far more economical carriage by water to Kurachee. And since the Gundava and Bolan Passes open upon Herat and Cabul, and through these cities communicate with Persia and Bokara beyond them, English manufactured goods ought gradually to percolate into these countries from the central depôt of Shikarpoor, and displace the present supply of Russian articles.

It may here be inquired whether Europeans can settle in the country, and if not, can these improvements be carried out without their energy and capital? It is confessed, with reference to the first question, that all the plain country is very unhealthy, especially within reach of the inundations, and at Shikarpoor above any other place. The moist exhalations from the soil and waters around that city act with extreme effect against the health of European children. Kurachee, however, is very healthy, "quite as much so as Bombay, and more so than Calcutta or Madras."* And, for the Punjab, there are fine hill stations where merchants or their agents might have their permanent places of residence. The natives show the greatest aptitude for business and carry on by themselves no inconsiderable trade (that of Umritsir is estimated at $3\frac{1}{2}$ millions sterling per annum); and with the superintendence of English principals at stated periods, all the details of a large commerce may be safely accomplished. Even money is by no means wanting for measures in which the inhabitants have confidence.† Eight

* Col. Turner.

† See the very interesting evidence of Sir J. Lawrence, in Blue Book, on 'Settlement in India.' 1859. Sess. 2. (121. ii.)

per cent. is thought a small return for an investment; and we read of irrigation works in Scinde paying dividends of cent. per cent.; but it is not surprising if the astute native merchants and bankers on the spot sometimes invest their capital to greater advantage than speculators in England. If we are not to spend our means without profit, we should be content to suggest and control the required improvements rather than undertake their entire execution.

CHAPTER III.—THE GANGES, UPPER AND MIDDLE.

The Ganges, its divisions. **The Upper Ganges**: **The Doab**, Canals of, Cultivation, Agra; **Oude**, Products, Condition of the People. **The Middle Ganges**; Benares, Patna; Industry, Indigo, Opium; **The Sone R.**; Kymore Hills, Iron, Lime; Rajamahal Hills.

The Upper Ganges.

The eastern, and much the more important, division of the Indo-Gangetic plain is drained by the River Ganges. The most convenient subdivision of this river is that made by geographers, into an Upper, Middle, and Lower course. The first has a south and south-east direction, for 550 miles to Allahabad; the middle section extends eastward to Rajamahal, 750 miles, and thence to the sea is a distance of 200 miles, again directed towards the south-east. The distinguishing features of these divisions are respectively "The Doab," the Plain of Bahar, and the Plain of Bengal.

On the north side of the Ganges, between it and the Himalayah Mountains, extends an uninterrupted plain of varying breadth. Allahabad is fully 150 miles from the hills, but at the great bend near Rajamahal, the river approaches within 80 miles of them. To the south greater variety prevails. At three several points the high land of the Deccan sends forth long lines of hills to the north-east, which encroach upon the river. The westernmost of these is the Aravulli Hills, a low continuation of which, in fact, stretches to the Himalayahs and forms the water-shed between the basins of the Indus and the Ganges. The next in order eastward, is the prolongation of the Vindyha Mountains, which closes upon the Ganges under the name of the Kymore Hills. These compose the

rocky banks of the river between Mirzapoor and Chunarghur. And, lastly, the Rajamahal Hills (which ultimately extend westward as the Sautpoora Mountains) come to the right bank of the Ganges at its great bend in characteristic broken ground and wooded spurs. Between the two first of these ranges is Central India, and the River Chumbul; and enclosed by the Kymore and Rajamahal Hills is the valley of the Sone River. The two streams just named are the only tributaries of note (if we except the Jumna), on the south side of the Ganges. On the north side, the lofty Himalayahs for nearly 1000 miles contribute their whole drainage, which issues in magnificent rivers 900 miles and 1000 miles in length; some of them sending quite as great a volume of water to the main drain of the plains as either the Jumna or the Ganges. On the north-east, the River Brahmaputra descends from the mountains through the valley of Assam, and together with its great tributaries—the Atree from Sikkim, and the Soorma from Silhet—discharges almost as much water into their united delta as the Ganges itself.

The Doab.—We shall commence the fuller description with that of the upper course. "The Doab," literally "Two rivers," lies between the Jumna and the Ganges, and extends from the hills to their junction, fully 400 miles. Measured across from Delhi it is 50 miles wide, but further south, opposite Agra, it is more than 80 miles. This tract has a much greater slope than the remaining part of the river-basin, falling from 1024 feet at Hurdwar to 400 feet at Allahabad. Hence, the streams run with rapid courses, and have worn for themselves deep beds. Hence also no inundations occur; for, although in flood-time the Jumna rises as much as 60 feet, yet it rarely overflows its banks. And since the soil is naturally stony and rugged, the rocks in many places protruding from the surface, there are large districts which, without irrigation, would be utterly bare. Moreover, in the vicinity of Delhi, the saline properties of the soil impart a brackish taste to the waters of the springs and wells. It is not easy to see then what has led to this district's being chosen as the seat of empire; but the fact is so, and, from the earliest

historical times, a great capital has always existed on, or close to, the present site of Delhi. The consequent demand for food, together with the presence of labour and means, early caused the formation of extensive canals. The finest of these ancient cuttings was for the convenience of Delhi. This canal fell into disrepair upon the breaking up of the Mogul empire; but was reopened by the English in 1820, to the great joy of the inhabitants. Since that time, very extensive works have been undertaken by the Government. The whole of the ordinary stream of the Jumna is now drawn off soon after leaving the mountains to furnish water to artificial channels on both sides. In each case the canal ends at the capital, but that on the west has branches extending past Hansi and Hissar. The total length of these canals is 580 miles. The Ganges canal is, however, much vaster in its plan. Leaving the river at Hurdwar, it follows the slight ridge down the centre of the Doab, by Allighur to Cawnpoor, and throws off branches to the right and left, the longest reaching the Jumna at Humeerpoor. These canals are, together, equal to a length of 810 miles, and are estimated to cost 1,500,000*l.** Of the good results of this work for the purpose of irrigation, there can be no question; although they fall far short of realizing the expectations raised by the projectors; for, unfortunately, the original scheme was too large for the supply of water, and as a means of transport it is feared the canal will be altogether a failure. Should this anticipation be fulfilled, the returns will be so small that the capital may be regarded as sunk for the benefit of the land.

Cultivation of the Doab.—It is the southern part of the Doab which is most in want of the fertilizing waters of irrigation. To the north, cultivation is carried on with the utmost success. Wheat, sown in October, in February covers the country with harvest fields of the richest aspect. Sugar-cane, opium, and indigo are largely grown, and a great variety of pulses, as elsewhere throughout India. Of these, the most common are dahl (*Cajanus Indicus*)—a

* This is only the estimate. The Barree Doab Canal cost as much, and yet is small by comparison.

small, brown, kidney-shaped seed; and gram (*Cicer arietinum*)—our chick-pea—which is largely used for horses. These legumes grow as tall as a man and attract attention by their frequent occurrence. There is little or no jungle in the Upper Doab, and even trees are scarce except in the neighbourhood of the hills. The Terai extends thus far westward, and its forests supply the timber and in great part the fuel for the large cities in the Doab and the plains. In winter time, a considerable degree of cold is felt, insomuch that ice is formed upon stagnant water; warm clothing is necessary; fires are comfortable, and a scarcity of fuel becomes a serious want. This is the dry season, when the country can be traversed in every direction. The main trunk roads are admirable, and even the cross-roads are good. Their excellence is to some extent due to the abundance of a kind of limestone called "kunkar," which occurs a few feet below the surface in the form of nodules; but it is also owing to the fostering care of Government that the roads of this district are the best in India. The usual native conveyance is a carriage drawn by a pair of camels, though light one-horse conveyances are increasing and the bullock-gharry is fast passing away. We have only to cross into Central India, however, and it is still the sole mode of transit.

Agra.—Many objects of deep interest to the historian and the architect are to be found at Allahabad, and Delhi, at Futtehpoor, and the sacred city Muttra. We can only bestow a glance at those of Agra. Here are the famous tombs of the Emperor Akbar and of the Noor Mahal; the Pearl Mosque; the gates of Somnáth, and the tomb of Noor Mahal's father. But it is the tomb of this peerless lady herself, the Taj, which excels all the rest in beauty and costliness, and is (Sir Erskine Perry thinks) the most beautiful building in the world. It is formed of the purest white marble inlaid with arabesque work of various colours; and in the principal apartment are the actual tombs of the Noor Mahal and her husband the Emperor Shah Jehan.* The English Government have

* The son of Shah Jehangir, mentioned in page 20. He began his reign in 1647.

taken measures to maintain this sumptuous mausoleum in good repair. It is approached and surrounded by avenues of trees, of the choicest fruit and thickest foliage, and the visitor is agreeably surprised by the offer of oranges, mangoes, and rosewater for his refreshment. There are few persons who pass through Agra but contrive to pay at least a second visit to the cool gardens of the Taj; and fewer are those who, having seen it often, do not wish to see it again.

Oude.—Passing now to the east of the Doab, we enter upon the province (lately the kingdom) of Oude. It is bounded by the Ganges and the Himalayahs, but no natural limit divides it from the plains further eastward. Oude is an almost level tract of country, fertilized by copious streams from the mountains, which flow gently through the province, watering the land without cutting deep beds. The Gogra is the principal river, and opposite Fyzabad is said to be larger and fuller than either the Ganges or the Jumna above their confluence. Its bed is 1600 yards across; and the stream, which in the dry season shrinks to about one quarter of that distance, spreads to a width of three miles during the rains. The Goomty (*i.e.* The Winding), a much smaller river, is an exception to the rule, and has worn for itself a channel 50 feet deep. Its tributary streams run in ravines of similar depth, and occur so often that the flat country is divided into nearly isolated portions. The peculiarities of this river scenery will be best understood from an example. Sultanpoor has the reputation of being one of the healthiest stations in India. But everything has been sacrificed to dryness of soil, and free circulation of air. The deep ravines quickly drain away the moisture from above. The bungalows, or European houses, are built upon the flat spaces between them, and perched on the verge of the cliffs look down upon the winding river below. No lakes or marshes, no malaria-producing jungles are visible from the cantonments; but we must add that there is not a grove to be seen within a mile, and even the shade of a single tree is precious from its rarity. Cultivation is chiefly limited to the crops of the rainy season. Gardens are

few, because water is too costly for irrigation; and that required for domestic use is drawn from wells sunk to the level of the running streams beneath.

A strikingly different phase is presented by the country west of Lucknow. We select the village of Beneegunge to the north of the Ganges. All around is a slightly undulating plain, of light sandy soil. It is but scantily tilled, though groves and clumps of the finest trees are studded thickly over it. Nearer the village, cultivation is more attended to, and the crops are fine and varied. A comparatively slight rainfall fills the numerous pools; and if they should fail, a supply of water is always to be found near the surface, and only costs the labour of digging a shallow well, and lining its crumbling sides with twisted bands of twigs and straw.

The Terai of Oude also exhibits its own characteristics. This region expands into an important section of the country, in consequence of the greater flatness near the hills preserving the moist conditions which produce it. It is estimated to cover 4000 square miles, but in it are many broad spaces well cultivated and containing flourishing villages. Excellent fish is obtained from the rivers, and immense flocks of water-fowl—ducks, teal, &c., inhabit the marshes. It is probably due to the more open character of the Terai here, as compared with it further east (where the rains are heavier, and the vegetation therefore denser), that it does not appear to be peculiarly unhealthy.

The bad reputation of the Terai is, notwithstanding, maintained by fever seasons from August to October, at the end of the rains, and during April, May, and June before them. The latter is the most dangerous time, and is attributable to the water then used for drinking being impregnated with petroleum from beds of that mineral in the hills. In autumn, the unhealthiness arises from the exhalations of stagnant pools filled with decomposing leaves.*

One or two of the forest trees of the Terai are so characteristic and so useful that they deserve a passing notice. The *Bassia latifolia* is a middle-sized tree called by the

* Col. Sleeman's Journal in Oude.

natives the Mohwah. Its flowers have a thickened, swollen tube in which is secreted a quantity of sugar, on account of which they are dried and eaten. For the same reason, the flowers are fermented for the manufacture of arrak. And from the seed or nut is obtained, by pressure, a thick oil, used for burning. So serviceable is the mohwah that it is constantly planted near the villages of Oude, where it grows without further care. Another tree indigenous to the Terai is the Sakhoo (*Shorea robusta*), closely allied to the Gurjun of Chittagong, from which a resinous substance exudes, that, when boiled with linseed-oil, is used as tar is with us, and also for varnishing purposes. The peculiar wants of the inhabitants of this region are further indicated by the use which they make of the roots of the Dhâk or *Butea frondosa*. From the fibrous bark of these they make a rope which does not rot by long exposure to damp, and with it they also caulk their boats.*

Products.—Throughout the whole of the northern and eastern parts of Oude there are the same uniform levels, possessing a similar rich fertility of soil. The wheat of Lucknow is among the best that can be grown, and has been likened to the *grano duro* of which the Italians make their maccaroni. Sown in October upon the heavier soils by the rivers' sides, it is irrigated when six inches high, again when about to flower, and is ready for the harvest in the earliest spring. The best is sold for from 16 to 40 seers per rupee, that is, 16 to 40lbs. for a shilling, but the people are so poor that they more usually support themselves on less palatable food than wheaten-cakes. Two or three crops are commonly sown on the same ground, one being reaped before the other is matured. Thus the oil-seeds—flax, rape, mustard, &c.—are mixed with wheat, barley, and sometimes the various peas; and the rude wooden oil-press, worked by bullocks, is as much an appendence of the farm as the hard threshing-floor where the same animals tread out the grain. Maize flourishes luxuriantly.† The poppy is widely grown, and as with the Til (*Sesamum orientale*), the oil of its seeds is

* Offic. Cat. Indian Collect. 1862.

† 'Twelve feet high,' at Gondah, Sept. 1, 1862, Private Letter.

much prized in cookery, even the pressed cake being eaten by the poorer classes. *Carthamus tinctorius* is another frequent crop, planted round the edges of wheat-fields, and enlivening them by its bright crimson thistle-like flowers. This plant is valuable, both for the oil of its seeds, and for the fine, but fugitive, scarlet dye supplied by its dried petals under the name of Safflower. The poverty of the people is indicated by the large cultivation of inferior seeds for food. The best of these are *Sorghum* and various millets; others are *Eleusina corocana*, resembling rape-seed, and *Paspalum scrobiculatum*, somewhat resembling rounded linseed, but both very uninviting in appearance, and containing so extremely little nourishment, that when deprived of their husks, the wonder is that anything at all remains to be converted into meal.

Condition of the People.—The dejected condition of the people is the result of generations of tyranny and misrule. The two last kings of Oude possessed all the vices of the worst of Eastern princes, with scarcely a redeeming virtue. Of the late monarch it is impossible to speak in terms too contemptuous. While he passed his time in the sole companionship of the lowest persons, whom he had made supreme because they fiddled and danced for his amusement, the great landowners built castles and armed their retainers, either to set the king's authority at defiance, or to rob and murder each other and the people. Any daring chief might seize upon a whole district and turn out all the tenantry, burning the villages and enslaving the inhabitants. A fort was then built and surrounded by bamboo jungle; and from hence raids were made in all directions. Sir W. Sleeman counted such jungles by the score, of sizes from three to 150 square miles in extent; and the larger ones contained hunting, shooting and fishing grounds for their owners. The reduction of the fortifications was a work of great difficulty. Those which were established among the ravines on the Goomty were almost impregnable. The bamboos, often 50 feet high and five inches in diameter, were impenetrable by cannon-shot; they were also too close to be cut down and too green to be fired. The only resource

was to shell the garrison out of the forts, when they commonly escaped through the jungle-paths, and proceeded to devastate the country elsewhere. The evidences of bad government are prominent on all sides; and a long period must elapse ere the ruined villages and cities rise again in their places, and the once productive lands, now covered with jungle, again reward the toil of the husbandman.

The Middle Ganges.

The Middle Ganges runs through a country which presents remarkable contrasts on the opposite banks of the river. To the north, there is but an extension of the plains of Oude, with their great fertility, if possible, increased; on the south, there is every variety of soil, combined with differences of altitude sufficient to produce considerable changes of climate.

Benares, Patna, &c.—The passage up or down the river being usually performed in the dry season, the traveller is apt to be disappointed in his expectations of the scenery. Its bed has indeed widened to between four and five miles in breadth, and during the rains presents an imposing expanse of turbid waters, rolling forward with a swift though silent course. But in the spring months, to which most of our accounts refer, the river fills only from one-sixth to one-fourth of the space between its banks; and the stream is so far below them that very little of the adjacent country is seen from the deck of a steamer. The great cities occupy prominent positions in the memory of the voyager, as breaking the monotony of his long passage. Their ghâts, or steps for reaching the river, are fine specimens of masonry: and in Benares the pinnacles and minarets of the palaces, temples, and mosques raise expectations of beauty and splendour, which are much modified by the squalor and wretchedness observed upon everything at a nearer view. The beautiful gilded dome of Aurungzebe's great mosque is a poor compensation for the thousands of dirty mud-huts, and the closely packed houses, six stories high, each of which is said to lodge as many as 200 persons at a time. Probably

the most curious thing in Benares is the ancient Observatory of Jey-sing, a rajah who lived about 200 years ago, in which are large astronomical instruments of stone, evidently connected with the study of astrology.

Benares is the religious capital of the Brahmins, and its great sanctity attracts enormous crowds of pilgrims. Patna, though rivalling it in size, is a comparatively modern city, deriving its importance from its trade, which is the offspring of English occupation; and the fleets of boats on the river below it attest its large commerce. Other towns occur at intervals upon the banks of the Ganges, but between them there is a great lack of variety. Villages are few, and trees are seldom seen, being mostly confined to the vicinity of inhabited spots. Even ferns and mosses are absent, for they cannot endure the dry season, nor do lichens colour the bare stones. Winding from side to side the river rushes strongly along, its muddy waters unimproved by the clear stream of the Sone. Little saharas of the whitest sand extend for miles, especially off the mouths of the tributaries, and the eddying wind raises gaunt columns from the incoherent mass which stalk along like the genii of desolation. The river swarms with alligators; a long-necked adjutant here and there is searching for offal at the water's edge, and on the bank a pariah dog has returned again to a rotting bedstead—the painful evidence of a most debasing superstition. At rare intervals the observer is relieved from the weariness of repeating this description by noting that a red garnet-sand from the gneiss of the Rajamahal Hills forms the dry river-bed; that flocks of white pelicans contrast with lines of tall, scarlet flamingoes; and that the Brahminee goose, gregarious by day, separates to its solitary rest at night.

If the traveller finds the Ganges monotonous while he is confined to his ship or boat, there is abundance of variety to amuse and interest him whenever he can land. Occasionally the change is forced upon him, by the vessel sticking fast in some of the numerous shallows, which the native pilots seldom regard in their steering. The country is well cultivated. In February, luxuriant crops of peas and

beans of various kinds scent the air with their fragrance. Wheat and barley are just coming into ear. Plantations of the castor-oil plant, notwithstanding their succulent leaves, remind a Kentish man of his native hop-gardens. Potatoes are in flower, and the fields are bordered with the bright-blossomed *carthamus*. Abundance of game excites the sportsman, whose enthusiasm is increased by the chance that, in beating for quails among the vetches, he may possibly start a pair of tigers.

At both ends of this middle section of the Ganges, the southern bank becomes picturesque by the approach of the hills. From Mirzapore to the fort of Chunar, the scenery exhibits much-admired combinations of cliffs and rocks, and forest-covered eminences; and again at Monghyr, the Rajamahal Hills begin to effect a change. Here steep banks and deep water form the foreground, and the town is backed by long, wooded ranges, whose outliers approach close to its walls. Monghyr is fortified; but the white two-storied houses on the hills give it an English aspect, which is heightened by the tall chimneys and smoke of the town; since Monghyr is famous for its manufacture of hardware and fire-arms, and has been called the Birmingham of India.* The same authority notes also the large groves of toddy-palms,—too characteristic of the habits of the people.

The country to the north of the river is distinguished by the name of Tirhut, a term properly belonging to a district close to the banks. It is a very gently-inclined plain, from 600 feet to 700 feet above the sea. Its northern portion is bounded by the Terai, equally level, where the forests become suddenly predominant. This part of the Terai is, however, in process of improvement; cultivation is gradually extending, and villages increasing, notwithstanding the unhealthy nature of the region. The number of wild elephants has diminished to such an extent that the supply for the native chiefs is now drawn from other parts, such as, for instance, the forests beneath the outer ranges of Bhotan. Yet Sir E. Perry relates that he was told of a village near Goruckpoor, which was then

* Dr. J. D. Hooker.

held by a wild elephant, that had driven out the inhabitants and killed ten of them.

In the plain country no feature is more frequently nor more pleasantly forced upon the observer's notice than the magnificent groves of mango, beautiful in their green and red foliage, and masses of fragrant yellow blossoms. The mango is deservedly prized for its delicious and refreshing fruit, "the fruit of India," and the grateful shade of its thick foliage, together with a draught of cool water from the well which is usually sheltered by the grove, is only to be appreciated by travellers in these hot plains. Hence, a well beneath a mango-tope is a public donation entitling the giver to the highest regard.

Indigo.—This is especially the district of the cultivation of indigo and of opium. Any good land is proper for indigo, but that recently cleared of jungle is considered the best. The European planter sometimes obtains a grant of land from Government for a long lease, upon payment of a small rent increasing for a time. Thus, in the case of a successful grantee, about 40 miles east of Goruckpoor, the planter held 13,000 acres: at first, for a few years he paid nothing; he gradually cleared off the jungle, and induced ryots, or cultivators, to settle. By the time it was all cleared he was paying 250*l.* a year rent, which would rise to at least twice as much; and then remain fixed for the rest of the term. His profit was about 3000*l.* a year. But this was an exceptional instance of success.* It is more common, and the wiser plan, it appears, to make arrangements with the native ryots to plough the land, to sow, to reap, &c. Hence arise complications which have been much misunderstood, and which have acted very prejudicially to the indigo-producing interest. The bargains are made separately with the ryots for each description of work. But, as they are very poor, it is customary to make them advances during the cold season, upon condition that they begin to plough with the first showers in April or May, to sow in June, to cut the indigo three months later, and so on. These contracts are not always faithfully kept.

* Sir E. Perry.

The ryot, having eaten up the planter's advance, considers it more profitable to sow rice than indigo. This is plainly a breach of contract, with ingratitude superadded. On the other hand, the ryots and their friends affirm that the planter takes advantage of the ryot's necessities to keep him in arrears, and then compels him to cultivate indigo when he might with greater profit till some other crop. If the charge were proved, it places the planter in the same list with the usurer, or any other hard task-master; that is, in an unenviable, but not an illegal position. Such conduct in the planter is clearly bad policy; for even the ryots will not always endure the oppression, and when they revolt there is no redress without measures too costly to be pursued. Hence the ruin of many planters. But that a plantation is a valuable acquisition to a district, by its disbursements of money, is proved by an instance (among others) in which one was closed on account of a quarrel with an adjacent land-owner, whereupon the whole neighbourhood petitioned every European they could gain access to, to use his influence for its re-establishment. Planters as a class have not been successful, though the influence of European settlers is acknowledged to be most beneficial to the country. The obstructions to their success are stated to be the insecure tenure of land, and the insecurity of person; so that as many as 50 lateeals, or club-men, have been kept on an estate to guard against the depredations of the neighbours, or through fear of personal violence.* It should be added, by way of caution against misapprehension of this statement, that this insecurity does not exist in the parts commonly occupied by Europeans, nor with respect to those planters who are not supposed to be making large profits from the labour of the ryots. In some parts of India, the cultivation of indigo is also objected to because the plant is considered unclean: but this does not seem to be regarded as an insuperable obstacle.

The species almost universally cultivated is the *Indigo-*

* Evidence of Mr. A. Forbes: speaking, however, of Lower Bengal.

fera tinctoria. It is a somewhat bushy plant, two or three feet high, with pinnated leaves of a bluish-green colour, and deep blue flowers resembling those of the common lupin; the seeds are like small yellow beans, and are borne in narrow, curved pods, The native indigo-makers extract the dye by boiling. The English planters always use an improved process by fermentation. The plants are cut when just about to flower, and immediately carted to the steeping-vat. Here they are covered with water and kept down by heavy frames of wood: a strong fermentation ensues, and the commotion is sometimes so great that the frames are loaded with weights to assist their pressure. In eight or ten hours, the water assumes a yellow tint, holding in suspension a bright green pulpy substance. This "mother-liquor" is then drawn off into the agitating vat; while the first is cleaned and recharged with fresh-cut indigo. In the second part of the process, the principal object is to prevent fermentation, but gain time for the pulp to "granulate." Accordingly the liquor is continually beaten and stirred by various contrivances: either large buckets, with holes cut through the bottom, are pulled violently up and down in it; or spokes are fixed in a bamboo and this is similarly moved; or, simpler still, the liquid mass is beaten by men with long sticks. Under this agitation, the contents of the vat become of a dark blue colour, and the pulpy portions are more defined and will quickly settle if allowed to do so. The stirring is then stopped, and after the sediment is deposited, the clear water is run off, and the deposit carefully removed to the drying-vat. Here a low degree of heat is applied, and the sediment is soon sufficiently firm to be further consolidated by pressure; after which it is cut into small cubical cakes about three inches each way, and when perfectly dry is ready for exportation. Much experience is required in this manufacture. If delay occurs after the plants are cut, the indigo is destroyed. If the exact moment for stopping both the fermenting and the agitation is not seized, the whole of the dye is not obtained, or its quality is deteriorated by carrying the processes too far. And if the drying-vat be

not carefully watched, the indigo may be hurt by the heat. At present, science has done little to reduce the manufacture to rules, and the goodness of the indigo made varies in consequence with every plantation. That from Behar and Bengal is the variety of the article most highly prized by the dyers of Great Britain, to which country it is all exported.

Opium.—The production of opium is another and even more prominent staple of this division of the Gangetic plain. The country around Patna is one vast opium garden, and presents a singular aspect in the month of February when the poppies are in full bloom. The production of opium is a Government monopoly, affording a revenue of from three to five millions sterling per annum. The cultivators are obliged to receive licence from Government to grow the plant, and are then compelled to sell the crude opium to the Government at a fixed rate. When the drug is prepared for exportation, the Government sales commence and a very high price is obtained, varying, however, with the fluctuations of the Chinese trade, for which nearly all the opium is purchased.

The cultivated plant is the *Papaver somniferum* var. *album*. Good land is required for its growth, but when it is of the best quality some hot weather crop is taken first, as maize or vegetables. The sowing takes place in October and November, after frequent ploughings and dressing of the ground according to the means of the cultivator. The poppy grows to a height of four feet, has pale-bluish leaves upon a branching stem, and large white flowers which give place to a seed-capsule about the size of a duck's egg. The growing poppies require frequent irrigation, and in the earlier stages are carefully weeded and thinned. The opium is collected in the month of March. At the end of February the plants are in full flower; and when the petals are ready to fall, they are gathered, and stuck together by their own juices into thin cakes to be used in an after process. A few days later, the poppy-heads are fully grown and the collection of the opium begins. A scarifying instrument is formed by tying, side by side, three or four strips

of iron, each about six inches long, and as thick as a knife-blade. At one end a notch is made as in a saw and the corners of it sharpened; the little blades are kept apart by passing between them a few turns of the cotton thread which ties them together, and the instrument, when used, makes three or four jagged cuts close to each other. The poppy-heads are scarified with these in the direction of their height, down one of the outer ridges which correspond to the internal partitions of the capsule. The operation is performed late in the evening, and the juice oozes out of the wounds during the night. A dry north-west wind with dew is considered the best atmospheric state, for producing a rich and fairly abundant flow of opium; a moist east wind spoils the quality. The heads are cut several times at intervals of a couple of days, until the milky juice ceases to flow in consequence of the capsules ripening. In the early morning, the opium is scraped off the poppy-heads with a small iron scoop. It is then carried to the receiving-house where it is all mixed together and sent in jars to the Government depôt. Here the chief attention is directed towards bringing all the opium to one standard degree of purity and strength, by testing, mixing and, when necessary, drying out the moisture. It has now to be made into "cakes," or balls. For this purpose the operator is furnished with the opium accurately weighed, opium-water made from refuse, or condemned and waste portions of the drug, and a heap of the thin cakes of petals before mentioned. He has also a brass hemispherical cup, inside which he forms a thick lining by many layers of the petal-sheets, sticking them together with the gummy opium-water. This is next filled with opium, and the lining produced and added to, till it covers the whole and converts it into a ball. These balls are then transferred to earthen cups and taken to the drying-frame, where they are freely exposed to the air. They are frequently examined to guard against the attacks of weevils, and to repair defects in the outer cases, and at length are carefully packed in boxes holding some 12 or 20 balls, each neatly fixed in separate compartments by

"poppy-trash," that is, the dried and crushed stems and leaves of the plant.

From the poppy-seed a very fine, limpid oil is obtained, 5 lbs. of seed yielding 2 lbs. of oil, under the rude native method by expression. It is used both for burning and in cookery. This oil is much appreciated in France. The seeds are also made into sweetmeats, which are said to resemble carraway comfits. The pressed cake is given to cattle; the empty capsules are boiled, and the decoction used in coughs, &c.; and the stalks when thoroughly dried by the hot winds of May are converted into trash for packing the opium.*

The cultivation and sale of opium is one of the most important branches of industry in India, in respect of the interests involved. The question is too large to be discussed here, if it did not more properly belong to our Chinese trade. As to China, the strongest fact in favour of our opium traffic is that the quantity we import bears but a small proportion to that which is home-grown; but at the same time it is admitted to be a common case for a Chinese labourer who earns 100 cash (about 4*d.*) a day, to spend 80 of them on his opium-pipe, and to starve himself to death in consequence. Meanwhile we have forced the Chinese Government to legalise the importation. As to India, most men who have examined the subject agree with Sir John Lawrence, who, while he condemns the trade in strong language upon moral grounds, yet does not see any means of raising the 5,000,000*l.* of revenue, which would be lost by its discontinuance.

Besides indigo and opium, the district now under consideration produces many other valuable commodities, several of which may be indefinitely increased in quantity. Such are Stick-lac, from which a red dye and a gum resin are obtained; safflower and madder, which are also the materials of red dyes. Cotton and silk are both products of Oude; the former is cultivated for home consumption, often with another crop on the same ground; and the latter is procured from cocoons found in the jungle. Patna is also celebrated for the production of rice, to a

* Pereira's 'Materia Medica,' vol. ii., part ii.

fine variety of which it gives its name; and Ghazepoor is embowered in fragrant rose-gardens, whose produce is gathered for distillation, 20,000 flowers, it is said, yielding only one rupee-weight of the precious attar, valued at 10*l.*

Sone River.—On the south side of the Ganges the principal cultivated district is the valley of the Sone River, bounded by the Kymore and Rajamahal Hills. This valley is readily irrigated by the superabundant waters of the river. Indeed the rains upon the table-lands on both sides flood the Sone to an inconvenient extent. Where the great trunk road crosses it, it is 2¾ miles wide when full, and it was found impossible to bridge it on account of the violence of the floods. The expedient practised is highly illustrative of India. A solid causeway was laid out from either bank, to the edge of the permanent stream in the dry-weather bed. As it offered little obstruction to the passage of the water, the causeway was found intact when the floods subsided. Then a temporary bridge was thrown across the shrunken stream, and thus the traffic was reopened every dry season. But the enterprise of English engineers has overcome this obstacle to locomotion, and the high-level bridge over the Sone is the most imposing, though also the most costly, work on the Trunk Railroad of India.

Upon the banks and fertile flats of the valley every variety of Indian produce is found in luxuriance. The best soils are occupied by the opium poppy, the fields of which, seen from above when in bloom, resemble a green sea bespangled with white water-lilies. At the same season (February) a more gorgeous sight is afforded upon every hill-side by the Dhâk tree (*Butea frondosa*). Its leaves are not yet produced, but the whole tree glows like a mass of flame, the effect of its singular blossoms, whose bright orange-red corollæ form a striking contrast with their jet-black calyces. These flowers yield a beautiful dye of their own colour, and are much used in India for that purpose, under the names of Tisso or Kessaree flowers.

The attention of the observer is, probably, more con-

stantly arrested by the fine ranges of precipitous hills which bound the Sone valley, especially on the left side. There are, perhaps, few views possessing more grandeur than that obtained on this river, where the mountain spur of Rotas overhangs its banks. The lofty perpendicular crags of red sandstone rise out of thick forest vegetation, and their tops are also covered with trees. One of the most inaccessible precipices is crowned by the extensive ruins of a fortress. This is Rotas-ghur, 1490 feet above the sea,—an excellent example of the eyrie-like castles of Central India, almost impregnable, and always one of the last to change rulers. Below is the village of Akbarpore among the gentler slopes of the underlying limestone, the white paths upon which assist the colouring of the picture.

Kymore Hills.—These red-sandstone cliffs extend to the head of the Sone, and then coalesce with the general level of the table-land. The same formation composes the plateau, and overlies the limestone throughout its whole extent. When a section is exposed, as it is on this eastern edge, the limestone forms a sloping base to the nearly perpendicular edges of the sandstone, the strata of which dip to the interior. This direction of the dip is of importance. If it had been outwards, all the drainage of the plateau would have run from it into the Sone; as it is, the moisture is directed inwards, and tends more than anything to bring about the strongly pronounced difference between the fertility of the Kymore and the barrenness of the Rajamahal Hills. The Kymore Hills, in agreement also with their geological structure, are full of mineral wealth. The building-stones which they afford (white, blue, grey, and dark red, easily worked, yet hard as granite), though their least valuable product, are in great request all over the plains of the Ganges. The sandstones are stored with enormous supplies of iron. Quarries producing the peroxide, the protoxide, and the sulphate of this metal, abound in the most accessible parts of the range. The ores are so rich, that, under the rude native process, they often yield 75 per cent. of pig-iron, of excellent quality for toughness, flexi-

bility, and capability of being worked.* The underlying limestones furnish lime in inexhaustible abundance. It is estimated that the average annual return is 400,000 tons, worth at the quarries from five to fourteen shillings per ton. This great variation is due to the uncertain nature of the native system of burning, which renders the quality uneven. But under European supervision, even if the price were not much lowered, the quality would be greatly improved. At present it is carried down the Sone and Ganges as far as Monghyr. The same limestone rocks produce also valuable lithographic stone, which can be had in almost any quantity. To complete all, the lower part of the valley possesses seams of good coal; and when the contemplated railway is in operation, which passing along the banks of the Sone is to connect Bombay with the Ganges line, it is not too much to expect that this coal will be brought to the iron and limestone, and the valuable products of the Kymore range be supplied to the larger portion of India.

Rajamahal Hills.—Very different is the aspect of the Rajamahal Hills. This plateau is the "raviny Behar" of Sir E. Perry, and it well deserves the name. The bare granite and gneiss country is topped by a huge round-shouldered eminence, named Mount Parasnath, 4500 feet high, the loftiest in the country for many leagues around. Near the River Ganges, greater moisture prevails and wooded hills occur, but on the table-land the peculiar character of the rock formation permits the water to escape to a lower level and there to drain away, so that no store exists for the dry weather. Hence there is great monotony of appearance. The cultivated plants are not those of the rich soils of the plains; no cotton or poppies, no sunflower or castor-oil plants are met with, but the staples of the cultivator consist of a little mustard, rape, and other oil-seeds, and small crops of legumes to split for dâl,—*Cajanus Indicus*, and *Ervum lens*,†—only

* R. W. Bingham, Esq., 'Cheynepore,' in Offic. Cat., Int. Exh., 1862, who gives an admirable account of the methods of the native iron-makers.

† The Revalenta Arabica of the shops is the prepared meal of this

relieved by the refreshing mango and the useful mahowa (*Bassia latifolia*). Near the small town of Gyra a saline efflorescence is gathered from the soil, which is an impure carbonate of soda. It is found to contain so large a proportion of flint (silica), that it melts into a kind of coarse glass without further addition, and to this circumstance is due the early manufacture of glass at this place. Saltpetre is also produced on this plateau in considerable quantities; but this article is made more largely in the poorer parts of Oude, where also glass is manufactured in the manner just alluded to, and used for making bracelets and other ornaments.

The Rajamahal Hills contain a valuable coal field, of which mention will again be made in connection with those of the Lower Ganges. The sterile character of these quartzose hills is rendered more conspicuous from the contrast afforded by the plains of Bengal and the valley of the Sone. The traveller on the great trunk road also remarks the decrease of temperature, and the untropical look of the jungle trees. But the weary monotony of the journey by "Dawk," a sort of box on wheels, is now exchanged for that by railroad, which is fast approaching completion throughout the whole length of the Gangetic-plain.

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pea, the origin of which is further disguised by the accompanying pictures of negroes tilling it. The transformation of name seems to have been ervalens, ervalenta, revalenta.

CHAPTER IV.—THE LOWER GANGES, ASSAM, AND THE S. E. PROVINCES.

Bengal: Tribes of the Terai; Verdure of the Province; Inundations; **The Delta**, Sunderbunds, Changes in; Calcutta; **Burdwan**, Coal-field; Products, Rice, Lac, Silk, Jute.

Assam: The Khaysia Hills, Rainfall, the River Soormah; **Industry**, Tea, India Rubber, Silk; Cachar; **Manufactures** of the Ganges Basin enumerated; Poverty of the People, Badness of the Roads.

S. E. Provinces: Physical Features of Further India; Coast of **Aracan** and **Tenasserim**; **Pegu**; Productive Industry; The Fisheries, Forests, Rice.

Bengal.

The plain of Bengal constitutes the basin of the Lower Ganges. It has its greatest length from north to south between the Sikkim Himalayahs and the sea. Towards the north-east and south-east are continuations of this plain, separated from each other by the Garrow Hills and Khaysia Mountains. The former of these is the valley of Assam watered by the Brahmaputra, and the latter constitutes the flat provinces of Chittagong and Aracan. Everywhere the slope of the country is most gentle. At Rampore Bouleah, near the head of the delta, the surface of the Ganges is not more than eighty feet above the sea; and the town, although situated on high ground, is but fifty feet above the river. Dacca is 172 feet, and even the valley of Assam is only 500 feet higher than the level of the Bay of Bengal.

The Terai.—The Terai of the Lower Ganges possesses most markedly all the characters of that region. The country beneath the mountains is here more level, the rains more heavy, and the moisture consequently greater than in the western divisions of the river basin. The soil is a tenacious clay, which assists in retaining the

water and forming the pestilential marshes. At all times of the year this district is extremely unhealthy, but during the rains (Apr.—Nov.) no European dare venture through it, except with the certainty of taking the deadly aul, or Terai fever; nor are the natives, either of the hills or of the outer plains, scarcely less liable to its attacks.* Nevertheless, the most dangerous tracts are inhabited by tribes who appear capable of resisting this dreaded fever. The few particulars known of these races, almost cut off from all other human intercourse, are extremely interesting. With a sallow and cadaverous appearance they yet enjoy good health, and are more robust than the Europeans in India usually are. Utterly barbarous in some respects, they evince in others the highest virtues of civilization. They are without letters, and their few contrivances are of the simplest nature. Their highest effort consists in the fermentation of rice or millet for the production of an intoxicating drink. The men burn down the forests to substitute small pastures or smaller patches of cultivated land, and their agriculture is of the rudest description; while the women spin, weave, and dye cloths of wool and other fibres. These tribes are further portrayed as inoffensive and hospitable. Their women are treated with the highest respect, and in all their family relations their conduct is most exemplary. They are known as Mechis, Bodos, and Dhimals, and collectively the "Awalian" or aul-resisting tribes; they are confined to the Terai, and, indeed, assert that they could not live out of it.

The Nepaul Terai, of which we are now speaking, averages 22 miles across, and is sometimes 30 miles. Along the outer skirts of it are valuable forests of saul (*Shorea robusta*), which is here a handsome tree, and affords large supplies of timber, useful for every purpose to which wood is applied. Its great specific gravity, equalling that of water, is the only drawback to its usefulness, as its elasticity, strength, and durability are of

* The late Lady Canning fell a victim to this insidious disease, the first manifestation of which is apparently increased health and energy.

the highest order. The saul forests border the River Teesta for some distance into the plain. This stream illustrates the tendency, before described, which rivers under certain conditions have, to move in longitude, for it is continually cutting down its west bank, and, judging from the absence of forests on the other side, it has gradually moved at least eight miles in this direction.* The natural history of this region is rich in birds. Several are migratory, and of the same species as those which visit England. Water-fowl abound as we should expect,—such as ducks and geese, especially the beautiful Indian solitary goose (*Anser Indica*), teal and others. Then there are cranes, and storks, the green heron and many gulls, together with hawks, the wild peacock, and upwards of 100 peculiarly Indian birds, including species of starling and kingfisher. This abundance of birds is equalled by the quantity of fish in the rivers and pools, so that the inhabitants are in no want of food.

In the plain country south of the Terai, forests are seldom met with, until we come to those of the Sunderbunds. Groves of Guava trees are planted around the villages, and a slender rattan palm is a characteristic feature in the scenery. Another palm (*Borassus flabelliformis*), called the Brab tree, is everywhere conspicuous by its ugly head of leaves, in look almost the counterpart of an ill-used birch-broom. It is the Palmyra, or Toddy palm, which, in Ceylon, assumes a much more elegant appearance. Here, it is chiefly preserved for the sake of the spirit manufactured from its sap, for sugar is never obtained from it. Its leaves are used for making mats. To a traveller, coming down the country from the west, the decidedly more verdant aspect of Bengal is a pleasing peculiarity. This is mainly due to moisture being deposited during nearly the whole year. The winter season is accompanied by dense fogs; and in the hot spring are frequent and very heavy thunder-showers, which sometimes take the form of violent hail-storms, when it is usual to find the hailstones as large as filberts.† Also,

* Dr. J. D. Hooker.

† Dr. G. Buist. Rep. Brit. Assoc., 1855.

the soil is an alluvial deposit of great thickness. At Calcutta, wells have been sunk to a depth of 140 feet without obtaining water, that is, without reaching the bottom of the alluvium. Hence, all the heavy rainfall, averaging 80 inches per annum, and the consequent inundation, probably does not saturate this thick deposit of earthy matter. It fills it, doubtless, to a great depth, like an immense sponge in contact with moisture on its upper surface. Then in the spring-time, as fast as evaporation dries the uppermost portions, they are replenished from below, at least in great part, and thus a constant verdure is maintained, instead of the aridity which covers the surface of less favoured regions.

All the most valuable and characteristic productions of Northern India are obtained from this part of the Ganges basin. Indigo, madder, and safflower; oil-seeds and pulses; jute, rhea, and cotton; rice, and maize, with all the fruits and vegetables peculiar to a hot, moist climate, and fertile soil. Sugar plantations attract the attention of the newly-arrived visitor; and the sugar-producing date-palm (*Phœnix sylvestris*) flourishes wherever it can be within reach of the sea-breeze. The production of silk from the true Chinese worm (*Bombyx Mori*) is also an especial branch of industry: the district of the mulberry commences where that of the opium-poppy terminates, and extends eastward into Assam, and southward to Cuttack: and "pat" silk, as it is called, forms a large item among the exports of Calcutta to Great Britain.

Inundations.—A very large portion of the basin of the Lower Ganges is subject to annual inundation; and this necessarily influences the condition and occupations of the people. With the earliest mountain-rains in April, the rivers begin to rise; and at the end of June the banks are widely covered by the floods, which continue to spread until, by the end of July, all Lower Bengal is under water. The houses and villages then look like islands, while their inhabitants go about in boats with their families and moveables, lest a sudden rise in the floods should carry away their homes. The height of

the inundation varies greatly with the distance from the sea: in the Sunderbunds it is scarcely felt; but at the head of the Delta, before the bifurcating arms offer increasing opportunities of escape, the waters rise 32 feet. All the tributary streams, also, overflow their banks. The Cosi inundates many square leagues near its mouth; and brings down such a volume of water, that no part of the Ganges is more dreaded by voyagers, as the opposing currents form violent and unexpected whirlpools which instantly suck down any small craft within their reach.

The Delta, Sunderbunds.—The Delta of the Ganges is 200 miles long, and from Chittagong to the River Hoogly quite 260 miles in width. It is divided about midway by the Megna, which also retains the name of the Ganges, and conveys the greatest quantity of water to the sea. But the Hoogly is deeper, and accessible to larger vessels at all times, the mouth of the Megna being obstructed by sand-bars. The Hoogly is also the representative of the sacred river, which began with the Bhagarati, at the Cow's Mouth in the mountains of Ghurwal. Towards the end of the dry season, the upper entrance to the Hoogly is not always practicable, and the steamer for the Ganges then descends from Calcutta to Mud Point, below Diamond Harbour; whence, turning into one of the streams to the east, it threads its way through the mazes of the Delta in a manner quite bewildering to the inexperienced. Nothing more desolate can be imagined than the scenery of the next three or four days' steaming. The jungle comes to the edge of the low muddy banks: at one time the channel widens to several miles, at another the paddle-wheels stir up the slime on both sides. No habitations are visible, and for thousands of square miles all is mud and monotonous jungle. The animal creation are the undisturbed possessors of the region. Alligators line the banks by dozens, and are generally treated to a few shots, but even a rifle-bullet, unless it strikes fairly, will glance from their scales, and only cause them to tumble themselves into the water. In early morn, deer and a few other creatures come down to

drink, and a tiger is occasionally scared by the steam-vessel; but with these and the ever-glowing sun, the incidents of the voyage are exhausted.

The Sunderbunds occupy a tract 50 miles wide, bordering the sea, to the west of the Megna. Here the jungle becomes, if possible, more dense and forbidding than ever. A dwarf date-palm (*Phœnix paludosa*), from six to eight feet high, is the prevailing feature, occasionally covering large spaces with its thick foliage to the exclusion of other vegetation. The gigantic reed-mace (*Typha elephantina*) is at times equally monopolizing, and not a whit more cheerful. Another abundant plant is *Nissa fruticans*, with a short creeping stem and tuft of unhealthy-looking yellow leaves, beneath which are the bunches of nuts; and the latter float about by millions, sprouting in the warm mud. Fogs are common in these dreary regions, adding to the discomfort of the passage through them by rendering necessary a stoppage at night. Malaria is rife at all seasons. The few villages are withdrawn from the river-banks; but the men are sometimes encountered when fishing, or cutting and piling wood for the Calcutta market. Near the Hoogly, convict establishments for salt-making existed, but they are now abandoned and in ruins.

The River Megna divides the Delta into an eastern and a western part, which present contrasts of the most striking nature. To the west, is a luxuriant vegetation, however monotonous. The brackish water of the rivers permits the growth of the mud-and-salt loving mangrove far up the Hoogly. The tides rise but 12 feet or 13 feet, and the rainfall at Cuttack averages 50 inches per annum. To the east, a bare expanse of mud produces only a few shrubs. Trees do not grow except they are planted. Although the tide rises 40 feet, 50 feet, and even 80 feet, yet this is met by such enormous quantities of fresh water from the Ganges and Brahmaputra that no mangroves occur until 10 miles south of Chittagong. At this town, 120 inches of rain is the annual mean, and in Aracan as much as 200 inches. The forests of the two coasts differ correspondently with the climate. The

banks of the Fenny and the Chittagong support trees which love a perennially humid atmosphere. At Cuttack are those whose habitat is a dry soil, and which can endure the alternation of wet and dry seasons. Thus the *Dipterocarpi*, nutmegs, and peculiar oaks of the former, contrast decidedly with the saul and sissoo, teak and ebony of the latter. Earthquakes also occur annually on the eastern shores of the Bay of Bengal, but rarely happen on the western.

The cause of the great difference of aspect on the opposite banks of the Megna, has been already indicated in our remarks upon the proneness which all such streams have to move to the westward. This tendency is continually producing extensive alterations throughout the Delta. No doubt can be felt as to the fact that the River Megna has receded to its present position through all the distance from the extreme eastern corner of the Bay of Bengal. The desolation left behind it is the result of the land being gradually cut down on its right, and deposited on its left bank. Even in the upper parts of the Delta the same evidence is constantly met. The ruins of Gour, once upon the river, are now five miles to the east. The changes are often quite recent. Rampore Bouleah, an important civil station, is half-washed away, and the dry-weather channel for steamers occupies the ground above which ran, but a few years since, the main carriage-road of the place, with a fine double avenue of trees. Property in land, especially upon a western bank, sometimes moves bodily off to the other side, if the expression may be allowed, and a planter may see his acres cut away beneath his feet (while his neighbour opposite is as quickly increasing his domain), until all is swallowed up.* The newly-deposited land is seldom as rich as that carried away; but in some instances, as at the mouths of streams, and generally in the region of inundation, the silt laid on every season is abundantly productive. In October, 1848, as much as six inches in depth of soil was deposited by the Megna on its banks;

* The field of Plassey has thus changed sides of the river near which the battle was fought. Evid. of Mr. Mangles.

and the shore line is here advancing upon the sea at the rate of four miles in a quarter of a century.*

The Brahmaputra exhibits equally astonishing changes. The main stream is now the Jummul, a large muddy river, which runs into the Ganges 70 miles to the west. And the dry bed of the Brahmaputra, sometimes five miles wide, is filled with the sand and silt, which was rapidly deposited as the change of course became complete.

Calcutta.—Calcutta is situated on the right bank of the River Hoogly, about 100 miles from its mouth. Running through the dismal Sunderbunds with a flowing tide, the first impression conveyed by the sight of this city is worthy of the capital of our Indian empire. The fine quays several miles long, pierced by numerous ghauts; the churches and temples; the beautiful European villas, each with its groves of mango and other fruit trees; the regular fortifications of Fort William, and, on the west side, the handsome and useful Government Botanical Gardens, are the prominent features of a magnificent scene. Upon a nearer acquaintance, indeed, the grandeur of Government House, must be set against the dirt and wretchedness of the "Black Town," where narrow streets and every species of inconvenience prevail. The river is here one mile in breadth, and is usually crowded with vessels of every flag, and of all sizes up to 1000 tons. It is with pardonable pride that we regard the creation of this fine capital with its large commerce on a spot, which at the beginning of the last century, contained only a village of fishermen; and which became permanently ours so late as 1757, when Lord Clive took it from the Surajah Dowlah.

The two great native cities of the Delta, Moorshedabad and Dacca, have lost much of their former consequence. They present vast accumulations of mud and straw huts, relieved occasionally by a costly but dilapidated temple or palace. The grand residence of the former rulers of Bengal at Moorshedabad, deserted by the river, is now in the midst of pools and marshes. The town is altogether fast decaying. Dacca, with a more beautiful site, is hardly more prosper-

* Dr. J. D. Hooker.

ous. The gardens of white roses and other flowers, the plantations of mangoes and oranges, plantains and pines, attest the superiority of the climate; but the manufacturing greatness of the town has departed. By a spasmodic effort, it can still produce such beautiful muslins embroidered in gold and silver as were shown at the International Exhibition, but English competition has virtually destroyed its trade; and the peculiar very long-stapled and exquisitely fine cotton of its fabrics is hardly produced at all in its neighbourhood.* The cutting of bangles from conch shells is now the exclusive business of Dacca, and that which flourishes best.

Coal-field. Burdwan.—On the contrary, to the north-west of Calcutta lies a district to which the English occupation has given immense importance. The chief city is Burdwan, connected by railway with the capital. The value of this region is due to its extensive coal-fields. Coal is, indeed, very widely deposited throughout India. It occurs at intervals along the line of the lower Himalayahs for 30° of longitude, that is, from the Punjab to Assam and the flanks of the Khaysia Mountains. Thence to the south, in the provinces of Aracan and Tennasserim, as far as 11° north latitude; and further still is Junk Ceylon, an island on the seventh parallel, which is said to possess excellent bituminous coal.† Again, the coal-fields on the west of the Ganges extend into Cuttack and Central India, with ramifications on the left bank of the Nerbudda and even in Cutch. Good coal is also obtained in Cachar; but the principal supplies have been hitherto drawn from the district of Burdwan. Here the total formation is estimated at 11,000 feet in thickness, and the quantity of coal is quite incalculable. Three distinct portions of the field are worked. The best Indian coal is raised at Kurhurbalee, near Hazareebaugh (24° North lat., 86° East long.), from seams of 7 feet, and 16 feet in thickness. The collieries of the Rajamahal Hills are usually open quarries, and have the further advantage of approaching to within 20 miles of

* The cotton-growing district is called Cupassia, from Kupas, cotton. Its soil is a red clay.

† Mr. J. R. Logan. 'Geol. Journ,' 1848.

the Ganges. And of the many places where coal is worked in the great Ranegange field, those upon the River Dumooda and its tributary the Singàrun are the most valuable, because the most accessible. From a recent classification, it appears that these coals leave more ash than those of England, but have a large amount of volatile matter. They are therefore well fitted for "blaze" furnaces, but not so much adapted for cooking. That of Kurhurbalee is, however, an excellent steam coal, its composition being carbon 66·7 per cent., gaseous substances 24·8, and ash only 8·45. The average proportions of the two latter constituents in the other sorts are 35 and 13 per cent. respectively. In the lower parts of the Damooda coal-beds, the mineral is altered by contact with basaltic trap; and in one place named Taldanga, it has itself become beautifully columnar, and is composed of small prisms about half an inch in diameter so slightly adhering to each other that specimens seldom show more than one complete column. The quantity of coal produced in 1860-1 from 16 collieries was 8,920,000 maunds, or nearly 400,000 tons. The railways and steam vessels in India are supplied by it; Calcutta and other cities are lighted by its gas, and the numerous black chimneys of Futtehpore and Ranegange on the grand trunk road forcibly remind the English traveller of the manufacturing towns in his own coal districts.

The trade and commerce of this region have increased manifoldly since the collieries came into operation. All commodities have risen in price, although their production has also largely advanced; and this part of the plain of Bengal is at present one of the most promising districts in India. Towards the south-west frontier of the province, the ground rises into the wild hills of Gondwana, covered with forests; and below these are extensive copper-mines and smelting-works, producing admirable metal from charcoal-fuel. Now that these parts may be reached through Midnapore and Ranegange, this production is expected to increase very greatly. Iron-ore lies in abundance upon these hills, and occurs as sand in the river-beds; and every stream yields a small quantity of

gold-dust to the very imperfect search of the native collectors.

Rice.—As in all Bengal, rice is the staple article of cultivation. Man and all animals feed upon it, and starch, spirits, and other productions are made from it. In Burdwan two crops per annum are obtained, of which the main one is sown in June and July and reaped from November to January. A dwarf crop is cultivated during Mar.—May, in easily-irrigated grounds; but in the hilly parts of Cuttack a second summer crop is also obtained between June and September, which does not require so much moisture as the others.* In the plains, all the roads are raised above the rice-fields, and bordered by the dhâk-tree and bamboo. Lines of tanks are everywhere prominent, white lilies floating on their waters, and their edges fringed with fan-palms and Indian dates. Among the hills, the finest wheat is grown, from which excellent bread is made. And at the local market of Sumbulpore this grain was selling, in the beginning of 1862, at the rate of 4*s.* 9*d.* per maund of 100 lbs.

Lac, Silk, &c.—Other portions of this region are covered by jungles of jujube-trees, of *Acacia arabica*, saul, dhâk, and other trees. These afford timber and charcoal in abundance, and the latter, when obtained from acacia-wood is much esteemed for making gunpowder. But the animal productions of these forest-jungles are the most valuable. We can only instance those of the lac-insect (*Coccus lacca*), and of the tussur moth†. In different parts of India these creatures affect various trees, the lac-insect often choosing the peepul, or banyan-tree; but in these jungles they commonly limit themselves to a few kinds, especially liking the assan-tree (*Pentaptera tomentosa*), and the saul and dhâk trees. The lac-insect deposits its eggs upon a small branch, and covers them over with a waxy secretion,

* The unhusked rice is here called Dhan. In Malay it is Paddih, whence our term for it, Paddy. Meyen.

† It has many scientific names, which in this case do not help to identify, and are therefore worse than useless. Dr. Royle says it is *Saturnia Mylitta*, alias *S. paphia* and *Phalæna paphia*. In the Exhibition of 1862, it is *Antheræa paphia*, from Bhagulpore, &c.

disposed in cells, whose longer axes radiate from the centre of the stem. In this state it is gathered under the name of stick-lac. The specimens we have from Bengal completely surround very small twigs, those from Burma and Siam are from branches two and three inches in diameter, and extend but half or three-fourths of the way round. Our finest samples have the resinous deposit fully three-eighths of an inch thick.

Stick-lac supplies a scarlet dye and also a resin, both of high commercial value. To separate them, the whole of the substance is pounded and boiled, when the dye enters into solution, and is removed with the water. This liquid is used at once by the native dyers, but the colouring matter is obtained for exportation by evaporating the moisture. The dye of commerce is in the form of small square lumps or cakes, perfectly solid. The best is nearly black in colour, and yields a dye, second in brilliancy only to that of cochineal, and probably superior to it in fastness. The resin is of a bright orange colour, and is prepared in various forms for the market, as in thin sheets, when it is known as button and shell-lac, or in small nodules,—seed-lac, or in solid lumps,—blocky-lac, the last being the coarsest description. It has a great variety of uses. It is the prime constituent of sealing-wax; dissolved in naphtha it is the liquid glue of the shops, and is thus largely employed in varnishing and waterproofing the ground-work of silk-hats; and it is a component part of marine glue, now consumed in large quantities in ship-building. The imports of dye and resin into Great Britain, in 1852, were about 17,000 cwts. of each article; but this quantity has greatly increased since that time: it mostly came from Bengal, to which may now be added the countries occupying the Malay Peninsula.

The silk of the tussur moth is also valuable as an article of export. To the northwards, in the district of Bhagulpore, this silkworm is extensively cultivated in the open air, and fed upon the leaves of *Terminalia catappa* and *Zizyphus jujuba*. Here the full-grown moth is an exceedingly handsome creature, five and six inches across its wings, of a brownish-yellow colour, with markings of

reddish grey, white and black. The caterpillar is correspondently large, being four inches long, and of a lively green, with brown and red markings. The wild moth of the jungles is probably not much less in size, as its cocoon is larger than a pigeon's egg. It is suspended by a hard stalk about two inches long, and when on the tree is concealed between two carefully-fastened leaves. The half-wild natives who collect the cocoons discover them by the excreta below. The eggs are also sought after and preserved for cultivation. The silk is wound off in the same way as the pat silk; and though of late imported into England, yet it is most extensively worked up on the spot, especially at Midnapore, and sent to us as tussur cloth. Its natural colour is a bright-yellowish brown; in texture it is very soft and glossy, and said to be extremely lasting. The soap-berry, or fruit of *Sapindus detergens*, is found in the same jungles, and is used in washing the tussur cloths.

Throughout the whole of this division, the fruits of *Terminalia chebula* and other species of the same genus are collected from uncultivated trees, to be employed as powerful tanning agents, under the commercial name of Myrabolans. They greatly resemble a shrivelled plum reduced to the hardness of wood. We import great quantities of this article, which might be almost indefinitely increased. The fibres of the region are equally important. The jute hemp (*Corchorus capsularis*) is the only one we can here mention. The plant is about eight feet high, and produces the fibre from its inner bark.* This hemp is largely imported by us. Without possessing the strength of common hemp, it is highly useful for making sacks, matting, and parts of carpets. It receives dyes readily, and its finer portions are so silky that they are said to be employed in the manufacture of cheap satins. In this country, it is most extensively used in Dundee. In India, European factories of jute have been commenced, at Calcutta and elsewhere, principally for the production of packing-cloths for other goods.

* Compare the lime-tree, a congener of the jute, the inner bark of which composes the well-known bass-mats of Archangel.

The resources of these districts are still in a great measure undeveloped, and whenever English enterprise shall be directed to them, we may be certain that their many products, now only known by specimens to the curious, will become highly profitable exports.

ASSAM.

It has been said that, from the plain of Bengal, the valley of Assam extends to the north-west, enclosed to the south by the Khaysia Mountains and the Garrow Hills. These highlands compose a very remarkable region. The Garrows only rise from 200 to 300 feet in height, and are formed of red and white granite in their upper parts, and similarly coloured clays and sands below. The most marked feature among them is a fine granite promontory, 220 miles from Calcutta, around which the Brahmaputra makes a wide bend, in the midst of a moderately undulating country. The Khaysias are much loftier, averaging 4000 feet, and occasionally rising to 6000 feet. From Gowhatty, in Assam, to Silhet on their south face, the distance is 80 miles in a straight line, and this is nearly all occupied by high ground. On the north, the valley of Assam runs eastwards at least 300 miles. To the south, Cachar is soon bounded by the hills of Tipperah, yet that province is estimated at 4000 square miles in extent, and Silhet is twice as large. The Khaysia Mountains present a rolling country atop, covered with grass, but exhibiting few trees and little cultivation. The principal crop grown by the villagers is potatoes, with which they supply the towns below on both sides. Steep escarpments of red sandstone fall at once upon Silhet and Cachar. These sudden heights intercept the full burst of the south-west monsoon, and are completely deluged. Cherrapoongee, 4000 feet above Silhet, is the most rainy place in the world. The season continues from May to October, and in that time as much as 650 inches, or upwards of 50 feet! of rain have been registered. With such an outpour we should anticipate singular conditions of life in the country beneath. The mountains

themselves do not seem over wet, notwithstanding this great amount of humidity; for the water runs off them rapidly in magnificent cascades. Bay-like valleys penetrate the cliffs, carpeted with the brightest verdure; and in these, tall palms, feathery bamboos, and spreading tree-ferns 30 feet high, grow in mazy luxuriance, and are typical of the moistest and warmest atmosphere. Beyond the bounded valleys are the open jheels, in a region which has been defined as the Sunderbunds of the Soormah, wanting the trees. The lakes and pools locally called jheels lie so close together that, from above, the country looks like a broad shallow sea at half-tide. Knolls rise up among them in various directions, sometimes to a height of 50 feet, and upon these are the inhabited and cultivated spots. In flood time the whole district is under water, the huts rising only a few feet above the inundations. And at all seasons, the lower parts of the River Soormah flow through marshes producing nothing save bushes and tall grass up to the water's edge. This vegetation, however, effectually conceals the surrounding parts; and when travelling on one of the numerous streams of dark, clear water, which compose the delta, only a few yards in either direction can be seen. But the boatmen of the jheels are a half-amphibious race, and steer their course through these intricate waters with the utmost certainty, having, apparently, no guides but the tide and the sea air to assist their instinct.

We are now able to understand the bearings of the extensive view obtained by Dr. J. D. Hooker from the top of Chillong Hill, 6,660 feet high, one of the loftiest summits of the Khaysia range. To the north, beyond the rolling table-land, appeared the valley of Assam, 70 miles wide; the Brahmaputra was distinctly seen winding through it, but reduced to a mere thread by its distance of 50 miles from the observer. A thin film of vapour hid all the low hills beyond; but this was crested by a line of peaks glittering like frosted silver, and, though 220 miles off, yet extending through 60° of the horizon, corresponding to 250 miles of the snow-covered Himalayahs. On the west were the Garrow Hills, 40 miles away; and those of

Cachar on the east, higher, and visible for 70 miles. Turning round, the experienced eye could detect the positions of the waterfalls on the edges of the Khaysias, by the rainbows on their spray; 100 miles away to the south lay the low blue hills of Tipperah; and to the south-west was the Ganges-delta, fully 120 miles distant, spread out flat like an ocean, and lifted by refraction. This wonderful view is at least 340 miles in length, and embraces an area of 30,000 square miles, that is to say, a region nearly as large as the whole of Ireland.

The province of Assam contains 30,000 square miles, by far the greater part of which is available for cultivation. Its vegetable productions include the finest mangoes, bamboos, and tree ferns; and the articles of commercial value which are known to exist in abundance are caoutchouc, gums of various kinds, including gum-lac, madder, cotton and rhea-fibre, oil-seeds, timber, gold and precious stones, iron and coal. To these may be added silk and tea, both wild and cultivated.

Tea.—The chief interest of Assam arises from its probable future as a great producer of tea. It is proved that the climate and other conditions of the south flanks of the Himalayahs are well suited for the growth of tea, from lat. 25° to 30°, and from long. 70° to 95°. Plantations are thriving from Hazarah in the Punjab, through Kangra, Ghur-wal and Kumaon to the River Kalee. Then the area of growth is broken by Nepaul; but tea flourishes at Dorjiling, again in Assam, and notably in Cachar and Silhet. In 1807, the late Dr. Royle recommended the Indian Government to take advantage of these suitable conditions, which he had pointed out. Mr. Fortune was at length employed to bring tea-plants and tea-makers from China, in which he succeeded beyond anticipation. In 1848, 20,000 tea-plants were thus safely brought to India, and the Government tea-gardens were formed in the west, in the Deyra Doon and Kumaon. When they were in full operation, seedling-plants were presented gratis to *bona-fide* intending cultivators, and now private persons and companies have the most flourishing gardens. Those of the Government are wisely continued to increase the supply

of plants; but they should not be compared with the others, in respect of profit and loss, since they were never intended to compete with them, or even to pay their own cost; but at the public expense to initiate a great public benefit by the production of tea on a large scale. This object has been fully attained.

Assam came into our possession in 1825, and is now in a perfectly quiet and well-affected state. The Assam Tea Company, established in 1839, have a grant of some 70,000 acres of land, of which 3,500 acres were under cultivation in 1859. The chief plantations are near Gowhatty and Debrooghur. Others are within 20 miles of the hills, where are the stations of Nunglow and Myrang, at elevations of 4,000 feet and 5,000 feet, with fine bracing air and dry soil. Millions of acres fitted for tea-growing are to be obtained in Assam, Cachar, and the west provinces. The Assam tenure is nearly the same as elsewhere. For 15 years no rent is paid; and till the twenty-fifth year the rent per acre per annum is three annas, about 4½*d*. The amount is then doubled for the remainder of the lease of 99 years, and finally a re-assessment upon reasonable terms is to be made. An analysis of Assam soil shows an unusual degree of likeness to that of the best tea soils of China. They are both remarkable for containing no carbonate of lime, and only traces of the phosphate and sulphate; while the iron present is in the form of a carbonate.* In the Terai district of Assam the climate is unhealthy; and upon turning up new land there is risk of fever; but in the neighbourhood of the cleared plantations it is suitable for European settlers with the aid of occasional visits to the hill stations. Although capital is required to bear the first four or five unproductive years, and this it is said should not be less than £2,000, yet afterwards tea-planting is found to be highly profitable. It is thought that nine per cent. is a small return, and even cent. per cent. has been obtained. The advantages offered to

* The analyses are (putting Assam first), water 2·45 and 3 per cent.; vegetable matter 1 per cent. in each case; carb. of iron 7·4 and 9·9; alumina 3·5 and 9·1; silex 85·4 and 76. Evid. of Mr. J. P. Saunders. Mar., 1859. Q. 3408.

young men, especially with a knowledge of farming or gardening, appear to be very great. An instance is recorded of a young assistant to the Assam Tea Company, who established himself on borrowed capital, and who in 1855 had 100 acres of tea planted, but not yet productive. In 1859 he was turning out 500 chests, or 40,000 lbs. per annum, yielding a profit of one shilling a pound! And this person's income was yearly increasing.

The Assam tea-plant is an indigenous species, and is preferred by the growers to the plants from China introduced by the Government. It has a larger and softer leaf, and more easily imparts its flavour, which is stronger and rougher than that of Chinese tea. Almost every pound of it is sent home to Great Britain, where it is sought after for the purpose of mixing it with the weaker classes of tea from China. Being in demand, it bears a high rate, and in 1859 the market price averaged upwards of 2s. per pound in London, exclusive of duty. As with other teas, both green and black are made from the same plant, often from the same dish, by changing the manipulation, principally so as to hasten the drying in the case of the former; but the bulk of the Assam teas are black, like Souchong. The means of transit admit of improvement. As yet roads are few, and goods are carried in the country boats to and from Debrooghur. Hence there is steam communication with Calcutta for vessels of about 100 tons and drawing five feet of water. Such vessels make the passage up in twenty days, the distance round the Sunderbunds being laid at 800 miles. Country boats go down in a month, and occupy three in the return voyage.

The most serious care for a planter in Assam, beyond the risk of sickness in reclaiming waste jungle, is the want of labour. The population of the valley, estimated at a million when we took possession of it, is said to be diminishing. At present they are all very poor: although previous to the anarchy which commenced in 1790, Assam was a flourishing kingdom; and beautifully carved buildings and other costly works attest its populousness and wealth. The diminution in numbers is stated to be caused by the pernicious extent to which opium is eaten. Its growth

is here unrestricted, and young children consume the drug to their complete enervation and early decay. To remedy this spreading evil, it is proposed to tax opium more stringently; and to secure more labour by importing it from the Khaysia Hills, and bringing coolies from Bengal. If only 30,000 acres of tea-gardens were cultivated in Assam, the produce might be estimated at 12,000,000 lbs. per annum; while Dr. Jameson calculates that the western provinces are capable of yielding a return of ninety millions; but he adds that if the natives of India acquire a taste for tea at the rate they appear to be doing, very little of this large amount will come to England. For they buy up nearly every chest at a price which sometimes rises to four rupees a pound.

As an example of the manner in which the presence of Englishmen develops the resources of the country, the production of India-rubber may be referred to here. Some years since, two gentlemen obtained a seven-years' licence to take caoutchouc in the forest of Nordwar in Central Assam. This forest is 30 miles long. The tree is the *Ficus elastica*, which sometimes overshadows a space of 600 square feet. The stem, or, if possible, the root, is incised, and about 30 lbs. of juice procured at one bleeding. The dry season is chosen, as moisture would deteriorate the gum; and when judiciously done the operation does not hurt the tree, or only very gradually. This rubber stands high in the London market; and all the Bengal exports of the article are supplied from Assam.

The production of silk in Assam was at one time so large and its use so prevalent that the Assamese were entitled to be considered a silk-clothed people. At present the cheaper cotton is more commonly employed, although considerable quantities of silk are still obtained. The silk is of three kinds,—the ordinary Chinese silk, produced in small quantities, and two native kinds, named Eria and Moonga. The latter is the filamentous covering woven by the grub of *Antheræa assama;* the moth is more solid in outline than the tussur moth, somewhat smaller, and more subdued in its colour and markings. Its silk is also slightly coarser, but of the same yellowish-brown

colour, and very abundant. Some is exported by way of Dacca and Calcutta, and the supply might be very largely increased by a steady demand. Eria silk is not produced in such quantities as the Moonga variety; the cocoon is smaller, and has the peculiarity of being hung in clusters like so many grapes. The moth (*Attacus cynthia*) is similar to the last-named, and the silk is a yellowish-grey fibre, of much flossiness and strength, but coarse. It is manufactured into a canvas-like cloth for lighter wear, and into plaids and wrappers, which are universally carried by the Assamese in cold weather.

Of the other articles enumerated, or which might be included among the products of this valley, we cannot speak in detail for want of space. Coal is abundant and good, as proved by its use on board the river steamers, and iron is at least equally plentiful.* As the jungle is cleared, the climate will become more healthy for Europeans (who always have the bracing hill-stations within reach), and with their capital and supervision the resources of Assam may be improved until more than her ancient prosperity be restored.

Cachar.—In Cachar and Silket, the first tea plantations were commenced in 1857, and are expected to be very prosperous, as the quality of the tea is reported to be superior to that of Assam. The want of labour would appear not to be so much felt here, for the people are more numerous, compared with the square mileage, and also better disposed towards work. The use of opium among women and children does not prevail, and the men consume more pawn, a compound of betel, tobacco, and lime, than any other drug.† India-rubber and lac are produced, and considerable quantities of good coal and iron. The principal occupation, indeed, of the Khaysias is the manufacture of iron, the ore for which is found scattered over the surface of the hills. Rice,

* Rhea-hemp (*Urtica tenacissima*) grows wild in immense quantities. It is eight feet high, and the fibre is in the bark. This is soft and glossy, and very strong, and, under a patent by Mr. Hill Dickson, is capable of being prepared for admixture with silk, cotton, or flax.

† Dr. Hooker tells us that the Khaysias compute distances by the mouthfuls of pawn they eat.

timber, and lime are articles of export to Calcutta, with which city a thriving commerce is carried on; the return commodities being chiefly salt and hardware.

In here bringing this description of the Basin of the Ganges to a close, we are obliged reluctantly to omit all but the bare mention of many occupations of the people and articles of value, the details of which it was impossible to insert within our limits. Thus we might have profitably compared the textile fabrics of the great cities, the graceful designs in gold and silver embroidered muslins from Dacca, with the perfect charts of massive colour in the goods from Agra, and the laboured taste displayed upon muslins embroidered in the Calcutta "chickun-work." Delhi is famous for its silk shawls, highly enriched by designs in floss-silk; and Benares and Patna no less so for their costly fabrics of woven gold and silver. The four last-named cities are also rivals in the production of plate and jewellery of the richest and costliest description. Carved work in wood and ivory, and elegant furniture after the English fashion, occupy a large class of persons. Again, Midnapore has a specialty for fine grass mats, and Lucknow excels in embroidered slippers and highly-wrought topees, or caps. All articles of use and beauty in brass and tin are made at Allahabad, and excellent pottery from the clays of its neighbourhood; while Cawnpore is occupied in its staple manufacture, the tanning of leather with the bark of the babool (*Acacia Arabica*).

Poverty. Bad Roads.—Two remarks upon the condition of the people are so important, and probably unlooked for, that they cannot be wholly passed by. We refer to the poverty of the natives, and to the paucity and badness of the roads. The mass of the people are poor in the extreme, and only do not suffer extremely in consequence, partly because a yard or two of calico and a few pounds of rice are sufficient for clothing and food (a pice is one-half of a farthing, and a man buys a dinner for one-third of a pice),* and partly because of the charity of the richer

* Pice is a European corruption of pies, plural of pie; the latter is the smallest copper coin = $\frac{1}{12}$ an. 16 annas = 1 rupee = 2 shillings.

classes towards beggars and pilgrims. Still, great distress, and the starvation of thousands, ensues, when, for example, a calamitous diminution of rain affects their staple crops; and at all times suffering from want of the merest necessaries of life is widely prevalent.

The badness of the means of communication is the fertile source of numberless evils. A famine may be decimating the people within a few hundred miles of overflowing harvests. Crops may perish because their sale will not defray the cost of conveying them to market. This great hindrance to the country's advance is in graduol progress of being remedied, mainly by the formation of railroads and lines of steam-vessels on the rivers. The magnitude of the spaces concerned should always be remembered in excuse for this deficiency of roads; the Great Trunk Road is 1000 miles long, and this is all British work. Moreover, during the dry season, a cart can move in almost any direction; although all such traffic is stopped by the rains. But the cost of road-making is the best answer to the charge of neglect; for it has been stated on the highest authority, that throughout large districts in Bengal roads would cost 2000*l.* and even 3000*l.* per mile;* and of the inutility of bridging the Nuddea rivers, even in the vicinity of Calcutta, we have given abundant proof.

When the system of roads now in contemplation is complete, this want will be in great part repaired. And, together with the much-increased settlement of Europeans which may be expected from the recognition of India as a possession of the British crown, will be among the most powerful material means of improving the country and of developing its immense resources. This improvement, the extent of which it is impossible to calculate, cannot fail to react with great force upon the trade of Great Britain by affording us, on the one hand, an almost inexhaustible supply of raw materials for our manufactures, and an equally limitless market, on the other, in which to sell our manufactured goods.

* Mr. Mangles, quoting the Indian Secretary of State. See Evidence.

South-East Provinces.

On the eastern side of the Bay of Bengal, three British provinces extend south of Chittagong, possessing upwards of 1000 miles of coast. They are Aracan, Pegu, and Tenasserim; and together they form no insignificant dependency of the crown.

The mountain chain which encloses the valley of Assam upon the south rises, as it proceeds eastward, to a great altitude. It also takes various names. We have seen that in its western parts it is known as the Garrow and Khaysia Hills; it is next called the Naga Mountains, which, north of Munnipur, are 9000 feet high; and ultimately, under the name of the Langtang, or Snowy Mountains, it attains an elevation of 14,000 feet, and contains the sources of the Irawaddy and other large streams. From the range thus traced, there are two great spurs thrown out to the south. The westernmost composes the highlands of Munnipur and the Tipperah Hills, and afterwards narrows into the Yomadoung, or Aracan Mountains. These are crossed near N. lat. 20°, by the Aeng Pass, which has a maximum height of 4600 feet, and is 50 miles from plain to plain. But they lower as they proceed, and terminate above Cape Negrais in a bold bluff, crowned by a gilded pagoda, which forms a gleaming landmark to the distant offing.

The other meridional chain of mountains is very lofty at its commencement; it is also more shattered and disconnected than the one just described, but it distinctly affects the nature of the country throughout its course, till it sinks near the coast at Martaban, between the "big-mouthed Sitang," and the River Salwen. In its southern parts it is inhabited by tribes called the Red Karens, who give their name to their habitat.

The long, narrow strip of coast to the west of these ranges constitutes Aracan. Between them is the valley of the Irawaddy, the southern division of which is Pegu. And another long strip of coast, reaching to the 11th parallel, forms Tenasserim. Aracan is about 10,700

square miles in extent, and its population is estimated at 363,000. Pegu has an area of 32,300 square miles, and contains 540,000 persons.* And the Tenasserim provinces are thought to equal 29,000 square miles, with a population of 115,400 souls. Collectively, therefore, this government embraces a territory of 70,000 square miles, with a million of inhabitants. The whole has been taken from Burma, Pegu having been annexed in 1853, and the rest in 1826.

The coasts of Aracan and Tenasserim are very low, much broken by islands, and intersected by sluggish rivers, which are usually navigable to a small extent. Several good harbours exist, but they are all more or less unsafe, or inaccessible, during the prevalence of the south-west monsoon. The flat shores are soon exchanged for a range of swelling hills, which, in the case of Aracan, have other low plains interior to them. The eastern boundary of both provinces is a range of mountains so densely overgrown by forests that scarcely anything whatever is known besides concerning them. Aracan, Akyab, and Sandoway are the chief ports of the northern province, of which Akyab is now the most important. It is on an island of the same name, possesses a good harbour, and is more healthy than many other parts of the coast. In Tenasserim are Martaban and Moulmein, both on the Salwen. The latter, also on an island, is the capital of the province. In the south are Mergui and Tenasserim, places possessing a small trade in timber and tin.

Pegu.—Pegu comprises the delta of the River Irawaddy and the country above it as far as lat. 19° 27′ north. In the upper part, whose chief city is Proome, there is much rolling hill country, with a dry soil, and dotted over with bushes of thorn and *Euphorbia*. But there is also here an abundance of excellent land, producing extensive crops of rice and cotton. Below Proome the river valley insensibly merges into the vast alluvial plain which forms the delta. The soil in these plains is eminently fertile: the most luscious fruits and richest oil-seeds flourish by the side of various tropical grains; and the production of the two

* Capt. Yule. 'Geogr. Journ.,' 1857.

great staples, rice and cotton, might be increased manifold under the incitement of a regular demand. Broken lines of hills project from the levels, and are completely shaded by the dense foliage of noble forests of teak, &c., during the rains, but in the dry season present only a surface like brick-dust beset with leafless stems.

The Sunderbunds of the Irawaddy are a vast labyrinth of creeks and channels, lined with mangroves as far as the tide extends, and by more useful forest-trees higher up, where, too, gigantic growths of grasses often come to the brink of the water. The Bassein, or western branch, is the best and deepest, although navigation upwards is stopped by a bar at its head, upon which, however, there are 10 feet of water during the rains. The Rangoon River is the most frequented, and this city is the capital of the province. The Sitang, like all other wide-mouthed rivers, is remarkable for its bore; and as the mouth in this instance is disproportionally big, the bore is so too. The wave rushes up the river at a speed of 12 miles an hour, with a foaming crest nine feet high, and not unfrequently flows back to the south-westward into the Pegu River of the delta. Near the mouth of the Sitang is a dreary expanse of thorns and elephant grass, but higher up its valley much rice is grown and silk produced; and as the trees do not lose their leaves in March and April, the scenery does not assume that sear and wintry aspect which the heat causes in other parts of the country.

The inhabitants of Pegu are represented as an industrious race, who fully appreciate the advantages of British rule. The Red Karens are a wild people, with all the physical characters of great social degradation. They have a currency of silver bullion, use the Burmese system of weights, and are both skilful and neat in their cultivation. They possess also, in common with other depressed tribes in Burma, the ruins of great cities, and certain manners and customs which indicate a higher civilization than any which now attains in these regions. Other tribes of Karens, known as Talain or Burmese-Karens, dwell in the south-eastern districts, extending into Martaban, among whom, within the last 40

years, Christianity has made a progress more marked probably than among any other Eastern people. The first missionaries were Americans.

Industry, Fisheries.—The commercial productions of these provinces, and those of Chittagong, have a great resemblance among themselves. The eastern peninsula of India is especially the abode of the elephant. Nowhere else are they seen feeding in herds by the side of horned cattle; but this sight is common near Limmé, a town of the Siamese Shan country. Accordingly, live elephants are chiefly supplied to India from this coast, and large quantities of ivory are exported.*

Delicacies of diet for the Chinese and Malays are also important animal products of these coasts. The choicest of these are the edible nests of a small sea-bird (*Collocalia fuciphaga*). This species of swallow inhabits the caves and crannies of the cliffs, and builds a nest between two and three inches in diameter, composing it of a mucilage ejected in small portions from its own crop. When properly boiled, they become lumps of transparent jelly, and in China are worth their weight in silver. At Akyab they fetch 80 rupees the seer, or about five shillings an ounce; and Rangoon is an equally good market for them. The fins of sharks are a dainty very much more reasonable in price, a pair being worth but five or six annas; but Biche-de-mer is another costly dish. It is a *Holothuria*, or sea-slug, and, when dried for sale, is a dark shrivelled mass about seven inches long, and as thick as a round ruler. Dried shell-fish, apparently bivalves of the mussel family, are also largely prepared. The fishermen of the Pegu delta are, besides, great purveyors of the Malay delicacy called "Blachang." It is a kind of paste made of mashed and pickled fish, and is the favourite condiment with all the Indo-Chinese peoples. The exports of this putrid fish-paste into Burma, where it is called Nga-pee, amounted to £142,000 in the year 1860-1. A numerous

* This valuable commodity is extensively used in Sheffield, where some 400 tons per annum are consumed, costing, in 1859, £600 per ton; and the consumption is only limited by the high price of the article.

and hardy sea-faring population are occupied in the pursuit of these articles of trade.

Forests.—The fine forests already mentioned supply many timber trees whose wood is available for all purposes. The districts of Akyab, Ramree, and Sandoway, are large exporters of hard woods. And many varieties not sent out might be procured in almost any quantity. These woods are adapted for furniture, engraving, inlaying, ship and house-building; and one species is so durable under water that it is said to become petrified.*

The forests of Pegu cover thousands of square miles. The best teak (*Tectona grandis*) is obtained from the Pegu Yoma Hills, between the Sitang and the Irawaddy; and both Rangoon and Moulmein are great exporters of the timber. Extensive as these forests are, they are but poor and small compared with those beyond the British boundary, to the north-east, on the Salwen and Meinam Rivers. Yet a tall tree in Pegu will measure 100 feet up to the first branch. The great forest of Eng, to the east of the Salwen, is another inexhaustible storehouse of timber of the largest scantlings, and second only to teak in strength and hardness. The wood of one splendid tree (a species of *Lagerstræmia*) is largely employed for ordnance purposes. Upon the high hills east of the Sitang, pines occur, one of which (*P. Khasyana*) is a stately tree often 200 feet high, affording a valuable wood, and being also rich in resin, but hitherto not sold at Moulmein on account of the difficulty of transit. The Toon-wood (*Cedrela Toona*), growing on lower sites, is extensively exported. The same hills produce abundantly the famous black varnish tree of Burma (*Melanorhœa usitatissima*).† White and milky when it first oozes from the tree, this liquid resin becomes black by exposure, and is then used for varnishing the lacquer-ware which forms one of the staples of the country.

Throughout the whole of these provinces, also, the Gum Dammar tree abounds. But in Chittagong, species of it

* *Dipterocarpus vaticus.* Intern. Exhib. Cat., 1862.

† The marking nut, *Semicarpus Anacardium*, belongs to the same Nat. Ord. Anacardiaceæ.

predominate over all others. It is here the Gurjun (*Dipterocarpus turbinatus*), which is the monarch of the coast, and extends its habitat to the tops of the mountains, 8000 feet high. It is a graceful tree of 200 feet, and often five feet in diameter, with a crown of broad glossy leaves, surmounting its pale-grey stem. To obtain the Dammar, an incision is made in the tree, with a hollow at the bottom of it: into this the resin distils, its flow being accelerated by lighting a fire in the opening made. This Dammar is the base of copal varnish, and by the natives is used also as a medicine, and as pitch. The wood is dark-red in colour, very hard, and among other uses is wrought into the wooden anchors of the native fishermen.

The *Acacia catechu* is found everywhere in Pegu, and large quantities of cutch are made for exportation. Myrabolans are another tanning material copiously produced: and stick lac is found of excellent quality and in great plenty. The sugar-cane thrives admirably, though it is little cultivated, and the sugar made from it is so coarse, that the product of the Palmyra palm, poor as it is, is preferable to it. But under proper management, excellent sugar might be made in abundance. Akyab supplies tobacco for export to Calcutta. Moulmein and Chittagong have naturalised the tea-plant, and at the latter place, coffee succeeds to admiration. The valuable Petroleum of the Irawaddy valley is reproduced upon the island of Ramree; and among the curiosities of production, Moulmein possesses a root, called Aigareet Myit, which is said to be a complete anti-alcoholic, insomuch that given to an intoxicated man he becomes instantly sober.

Aracan Rice.—A few remarks upon the rice trade of these provinces must finish this part of the subject. Two principal kinds comprise the hundred varieties which are distinguished by the natives. The one is grown on the hills, requiring little or no irrigation, and the other in the low-lands, which grows almost entirely in water. Both are sown in May or June, with the commencement of the south-west monsoon. But as the hills usually receive the first rains, the crops there are the more forward, often by some weeks. From October to November is the time of

harvest, and by the end of the year the cleaned rice is ready for the market. Akyab and Rangoon are the chief exporters of rice to Europe. In Pegu, the "hard" variety is selected for exportation, as it keeps better and is less broken in husking than the "soft" grained. The latter is preferred by the Burmese, on account of its superior flavour; and this quality has led, also, to its being received with favour by some of our continental neighbours, to whom increasing quantities are annually sent. In Aracan, the occupation of the English has quite changed the character of the rice market. The difference first became evident in 1845, previous to which the exports of this grain were sent to China and the Straits. Since that time an immensely larger trade has sprung up with Europe; and while the hard variety, which is preferred, is more profitable in its return per acre, at the same time the rise in price has been such as to drive the Chinese dealers to purchase elsewhere. In 1861, the production of rice in Aracan was estimated at 220,000 tons; and the annual exports to Europe, chiefly to England, at 112,000 tons, and about 4000 to Eastern ports. The price formerly varied from 50*s.* to 70*s.* per ton, for cleaned rice, but during the last ten years the average value has been 5*l.* The port of Akyab monopolizes nearly the whole of this trade, for which it is well adapted, in consequence of its possessing great facilities of water-carriage from the interior. As the inhabitants of these provinces increase, and as they become more completely amalgamated with the British Indian Empire, it is to be anticipated that the countless acres of land now lying waste may be cultivated to a considerable extent, in such useful products as tea, coffee, sugar, cotton, and other commodities, for which their soil and climate are so peculiarly adapted.

CHAPTER V.—THE DECCAN AND ITS DEPENDENCIES.

General outline of the country. The principal watersheds.—**The Vindhya System**; Central India,—The Plateau of Malwa, Opium; Saugor,—The Nerbudda, The Taptee: **The Western Ghâts**; Roads, The Concan of Malabar. **The Southern Hills**; The Neilgherries, Ootacamund; Mysore, Nagpore; Rivers of the Deccan, Nulla Mulla Hills: Concan of Coromandel; Irrigation of **Deltas**, the results compared; **Orissa**; Iron; Cotton; Development of resources of India; **English Influence** on the Condition of the People. Imports and Exports.

The Deccan and its Dependencies.

The third great physical division of India proposed was the Deccan with its appendages of the table-land of Malwa, and the Concans, or low coasts on the east and west. It is usual to describe the Deccan as an elevated plateau, of a triangular shape, bounded by the Vindhya Mountains on the north, and by the Western and Eastern Ghâts on the remaining sides. The direction of the rivers shows that this enclosed plateau is tilted in such a way as to be highest towards the north-west corner, whence it happens that the numerous streams burst through the bounding chain on the east and drain into the Bay of Bengal. The latter observation certainly brings the foregoing description nearer to the truth; but the physical geography of the whole region is very complicated, and some parts of it are still all but unknown to Europeans.

It will be more in accordance with an endeavour to show the relations which exist among the natural features of the country, if we first trace the main lines of watershed. Of these there are two, each about 900 miles long, and placed nearly at right angles to one another; namely, the Western Ghâts, and the system of the Vindhyas, regarding the latter as the whole of that mountain range

which stretches across the peninsula in the neighbourhood of the 22nd parallel, and subsides in low ridges near the eastern coast south-west of Balasore. Filling up the great angular space thus limited are the table-lands and valleys of the Deccan, whose south-eastern side is sometimes bounded by mountains rising high above it; but which, in other parts, only affects the vertical section of the peninsula by the ruggedness of its own edge.

The Vindhya System.—The northern watershed has a very complex ground plan. In most maps a nearly blank region will be found in the space enclosed by 22° and 23° N. lat. and long. 80° 30′ and 82° 30′ E. This is occupied by the table-land of Omerkoontak, some 7000 feet high. A temple of the same name, situated close to the sources of the River Nerbudda, is visited by crowds of Hindoo pilgrims, but we have never met with any European account of this district. As the point of contact of the multiplied mountain ranges lying between the Ganges basin and the Deccan, this plateau is physically of importance. To the west, there extends a broad mass of high ground, divided longitudinally by the parallel river-beds of the Nerbudda and the Taptee. The northernmost portion of this constitutes the Vindhyas, the central the Sautpura Mountains, and the southern the Mahadeo Range. Towards the east, are what may be considered the prolongations of the two first named of these; for the Kymore, or Bind Hills, appear to continue the Vindhyan Range, and the Rajahmahal Hills, by their crystalline composition, seem to be in geological connection with the Sautpura Mountains. Again, to the south-east an unnamed line of rugged hills runs along the left bank of the River Godavery to near its mouth, and at the same time limits the Deccan in that direction. The reader may trace this range by the names of Kyraghur, Wyraghur, and other ghurs, or hill forts, which occur upon its western margin.

Between it and the Rajahmahal Hills is a broad space mainly occupied by wild mountains and forests, and peopled by half-savage tribes of men. This country is named Gondwana, and towards the north-east, descends in

rugged slopes upon the frontier of Bengal. In its southern portion, appertaining to Berar and Orissa, is the valley of the Mahanuddy, which first runs north and then east and south-east past Cuttack to the sea.

If, now, we imagine this entire mountain tract, with its included river-basin, to depend upon the great northern watershed, along its south-eastern half, or the Rajamahal Hills; then, similarly, the table-land of Malwa, with its included valley of the Chumbul, slopes away from its north-western half, that is, from the Vindhya Mountains. It is true that these two appendages are wide contrasts in respect of character and productions, no less than in our knowledge of them; but as tending to simplify the conception of this complicated system, we may be allowed to regard them as a pair of great windmill sails balancing each other on opposite sides of a huge mountain axis about the central table-land of Omerkoontak.

We shall have less difficulty with the simpler plan of the Western Ghâts, which form the other main watershed of Southern India. Their local name is the Syhadree Mountains, and the term ghâts belongs properly to the passes through them; whence the upper country is called the Bala-ghât, and the coast the Payan-ghât, or that below the passes. This range is united about 10 miles south of the Taptee to the continuation of the Mahadeo Hills. Thence it runs in a continuous line to lat. 11° N., at varying distances from the shore. Behind Bombay, and also in the rear of Mangalore, it is 30 miles inland, but near the 14th parallel its flanks form a fine coast line for nearly 80 miles, and again the offsets of Mount Dilly, north of Telicherry closely approach the sea-board. At the 11th parallel a singular breach occurs, called the Gap of Paulghaut, or Coimbatoor; but beyond this are the mountains of Travancore, of which we know little more than that they contain summits upwards of 7000 feet high, and that though superficially a continuation of the Western Ghâts, their geological formation rather connects them with the eastern ranges of the peninsula.

We are now able to deal with the Deccan itself. United to the Ghâts, and overhanging the Gap of Coimbatoor, is a

lofty mountain mass called the Neilgherry Hills, nearly 9000 feet in height. They are the commencement of a broken line of mountains sweeping to the north-east as far as the River Mahanuddy, under the collective title of the Eastern Ghâts. And all the country interior to the latter is an enclosed basin like the bed of an immense lake whose waters have burst their retaining bund in several places on the east, and laid dry its surface. The existing lines of drainage are the courses of the Godavery, the Kistnah, the Pennar, and other smaller streams, all of which run in a south-eastern direction. In its western portions, this enclosed basin rises nearly to the level of the bounding chains, and is in fact composed of their broad offshoots, or of still broader table-lands, hanging in massive terraces to their flanks. Thus in the angle made by the junction of the Neilgherries and the Western Ghâts, is the plateau of Mysore, whereon are the sources of the Cauvery, a river which also breaks through to the south-east, and there waters the plain of Trichinopoly. And on both sides of the upper Godavery are wide hill-ranges which extend in the direction of the river, and very slowly descend by steps to the eastern parts of the enclosed basin, where Nagpore is but 900 feet above the sea, Hydrabad 1700 feet, and Bangalore 2908 feet.

Malwa. Opium.—Having now roughly delineated the prominent features of the division before us, we proceed to fill in the picture by sketching some of the details of each. It has been said that the north side of the Vindhya Mountains supports the table-land of Malwa. This plateau is a tolerably level tract of country about 160 miles from east to west, and perhaps half as broad. It slopes gently to the north, where it is fringed by the disconnected ridges of the Harrawutty Hills, through which the drainage breaks in numerous rapids and cataracts. Indore and Oojein, great cities at the foot of the Vindhyas, are nearly 2000 feet high, while Rampore, which guards one of the northern passes, is about 700 feet lower. The bounding ranges do not rise more than a few hundred feet above the plain, though sufficient to protect without overwhelming it. A rich volcanic soil covers this plateau and renders it

extremely productive in all the vegetation of Northern India. The staple, however, is opium, the cultivation and manufacture of which is here carried on by private enterprise. The process differs very little from that already described. The seed is sown in November, and the poppies flower early in March. The extraction of the juice then proceeds till the end of April, and after it has been allowed time to settle and become uniform, the cakes are manufactured in June and July. Their shape is not quite identical, for Malwa opium is made up into small solid balls, while that of Patna is a soft, jelly-like substance within a rind of dried poppy petals, and the balls are larger in size. The latter description is also considered the more refined, but the Malwa drug the stronger of the two kinds. From an official statement published in 1853, it appears that a chest of Benares opium of 164 lbs. weight would cost the government 280 rupees, and sell at Calcutta for 900 rupees, producing a profit of 7*s.* 6*d.* per lb. In the case of Malwa opium, the revenue is collected by imposing a transit duty upon it as it is conveyed to Bombay for shipment to China. Thus a chest of 140 lbs. which pays a duty of 400 rupees, would yield a revenue of about 5*s.* 8*d.* per lb., showing a difference of 20*d.* in favour of the monopoly system. The Bengal production increased during the years 1840-9, from 17,850 to 36,000 chests, while that of Bombay remained nearly stationary at 16,500, the weights just given being retained in both cases.

Beyond the Harawutty Hills is a very rugged country of indifferent fertility extending to the banks of the Jumna, near which is the famous hill-fortress of Gwalior. The whole of the region, Malwa included, is bounded on the north-east by a broken range named the Aravulli Hills, among the fastnesses of which the Rajpoots retreated when their country was overrun by invaders.

Mount Aboo is an isolated hill at the south end of this range, 5000 feet high, covered with jasmin and wild roses. It is the sacred mountain of the Hindoo sect of Jains; and to every glen is attached some sacred legend, and every knoll is adorned with a costly temple of white marble. To the west, the eye of the traveller wanders over the

blank desert of Thur, extending far beyond the horizon, to the Indus, but checked in its advance beneath him by the Aravulli Hills, whose summits draw moisture from the atmosphere, and periodically produce vegetation at their base. Their inferior height does not permit them to yield perennial streams. Even in Rajputana, on the east, the aspect of the country in the winter months is very bare. And north of Odypoor is a vast unbroken plain, covered with thorns and bushy mimosas; but which, when irrigated, completely changes its nature, and bears exuberant crops of cotton, sugar, and wheat. At all times, too, there is abundant pasture, which herds of camels (the common beast of burden) share with flocks of the native white-wooled sheep.

Saugor.—At the extreme east, the table-land of Malwa merges into a mountainous country formed by the Harawutty and Vindhya Mountains. The chief town here is Saugor, a healthy military station, in the midst of rolling hills, covered with jungle, which is full of tigers, deer, and other animals of chase. In the rainy season every square foot teems with verdure, and even in the dry spring the breezy air is invigorating, and nature is not scorched up as in the lower parts of India. The cantonments are on a ridge in a plain by the side of a lake, and the church tower and the European houses remind the Englishman of home. The town stretches along the water's edge, and the ruins of a fine old fort add picturesquely to the effect, which is further increased by the shade from magnificent groups of bamboos. And then, for the life of the picture, let it be evening on the 8th of March, the feast of first-fruits, and the natives, arrayed in the gayest colours, crowding down to the ghât, where young maidens have brought plates of fruit and flowers, and pots of sprouting wheat: these they set afloat, a light in each, and, as they watch the twinkling stars sail slowly off to leeward, strive to augur from their continuance a successful ending to their vows; while strange music is sounding, and dull tom-toms beating everlastingly, and all the revelry of an Indian fair is continued through the night.

Saugor is an out-of-the-way place, and is reached from

the east, by travelling through Mirzapore and Jubbulpore. From the latter, the road is a mere cart-track, impassable except in dry weather. The usual conveyance is a spring-van drawn by bullocks, called a bullock-gharry, in which the traveller ensconces himself with his bed and baggage. He probably moves by night, and sleeps by the road-side during the day. The heat reflected from bare rocks is often very great, reaching 90° and 100° Fah. even in March; but the nights are cool and pleasant. The badness of the road, however, sometimes necessitates travelling by daylight; for the steepest ascents are complicated by loose rocks, and bridgeless watercourses full of holes have to be crossed. It is but a small annoyance to go down an incline so steep that the cattle cannot be kept from sliding, while the wheels are almost axle-deep in impalpable dust.

The road from Mirzapore to Jubbulpore crosses the Kymore Hills, affording very extensive and beautiful views of the low country left behind. The hills descend towards the Ganges by steps, over which the copious drainage pours in numerous cascades. Thus on one stream are four fine falls of from 300 feet to 400 feet in depth, within a distance of only 40 miles. The tops of these hills are about 2000 feet high, forming an undulating country, full of rocks, but plentifully watered. Fine mango trees, scattered over the fields, give a park-like character to the scenery, which is sometimes diversified by a rough forest full of large monkeys, and occasionally again by a valley between perpendicular walls of sandstone, almost choked by fallen blocks. Rewah is one of the few towns which the road passes through. Its very name is cotton, and in spring time the bullock-hackeries, laden with the crop, create quite an appearance of traffic towards the Ganges. Very fine wheat is another production of these hills. Before us are samples taken at random from a bazaar in Saugor, and the first quality (*Hunsiah Gaehoon*) is equal to the best that is sold in our own markets. The average selling price of such as this at Jubbulpore is from 30 to 35 seers for a rupee.* But other sorts are to be had cheaper.

* A seer is about 2 lbs., and a rupee 2*s*.

Rice is grown in the valleys during the hot weather, and oil-seeds, especially castor-oil seed, which is sent in large quantities down the Ganges to supply the oil-manufactories of Dinapoor. Flax, producing a fibre every way fitted for our market, may also be grown abundantly on these hills when the necessary means of transport are obtained. And cutch is made wherever a stony soil produces the *Acacia catechu*. The eastern parts of the Kymore hills, approaching the River Sone, are the largest sites of this production. The process is very simple. The dark-coloured heart-wood of the *Acacia* is cut into small chips and boiled. Fresh water and chips are supplied as needed, until the liquid becomes dark and thick, when it is strained into moulds, or upon a grass mat. It then hardens into a mass of rich brown colour, having a glossy fracture; and in this state is exported for the use of our tanners. The inhabitants of the Kymore ranges are an industrious race, and more hardy than the people of the plains; but they are very poor. We can as yet claim little credit for anything we have done towards developing the country's resources, beyond commencing a rule whose profession is security and justice to all classes alike.

The Nerbudda and Taptee.—The triple line of mountains, forming the western half of the great northern watershed, comes next under consideration. It varies from 100 miles to 160 miles in breadth; but this distance is partly occupied by the valleys of the Nerbudda and the Taptee. The former of these rivers leaves the table-land of Omerkoontak at Mundla, and then flows through a flat-bottomed valley which sometimes spreads out to a width of 30 miles. At other times it is narrowed to a mere gorge, and the navigation is interrupted at intervals by rocky bars, till it enters the plain of Guzerat. For instance, about 10 miles from Jubbulpore is the Byrah Ghât, more than a mile in length. It is a magnificent defile, bounded by perpendicular cliffs of the purest white marble, 100 feet high, weathered black atop, and intersected by dark fissures with the regularity of masonry. In the dry season, the still, deep stream, may be descended in a country dingy, and the daring visitor may climb the

rocks to naturalize among bats, swallows, and pigeons which swarm in the crevices; wild bees, whose nests hang from every corner, and brilliant-coloured reptilia: or he may amuse himself by scaring away the long-tailed, black-faced monkeys, that carry off their young clinging round their necks, and testify their displeasure by loud jabbering and most absurd gesticulations. The country hereabouts is extremely wild, and given over to jungle, a famous hunting ground: but even on the middle course of the Nerbudda, where former misrule has depopulated the rich alluvial flats, the thickest jungle predominates, tenanted only by antelopes and beasts of prey, and forbidding a renewal of occupation by the exhalation of pestilential vapours.

The River Taptee is not more than half the length of the Nerbudda. It is formed by the confluence of two streams, the Poorna being the southern source. Between them run the Mahadeo Mountains, 4000 feet high, which further west may be termed the Northern Ghâts. This river-valley, like the last, contains much soil of the richest description. Towards its lower parts the stream has cut out for itself a deep bed, and similar gullies enter it at right angles, reproducing the peculiar scenery of the River Goompty, in Oude.* The chief city on its banks is Surat, where the first English factory in India was established in 1615; it is 20 miles up the river from its mouth, in the middle of the coast plains, and has a great trade in cotton and jute-hemp, and still manufactures costly shawls and kinkhabs of silk and gold thread; but its productions are much diminished by English competition, although its commerce has greatly increased.

The mountains enclosing these rivers vary from 2000 feet to 3000 feet in height. The Vindhya Range is flat-topped, generally about 200 feet above the table-land of Malwa, but falling very steeply towards the Nerbudda, its enormous buttresses even encroaching on the river's banks. The Sautpura Mountains also descend very quickly towards the south. In consequence, the roads over this region are very difficult; but the Bombay and

* See page 45.

Ganges railway is to pass near Jubbulpore, and will be an inestimable boon to the whole district. The town just named has already a specialty for making iron, and the small forges around it are numbered by thousands, while brass and iron workers compose the majority of its inhabitants. One of the first results of the completion of the railroad will probably be the utilization of the excellent iron-ore known to be so abundant in these mountains.

The brief remarks we have to make concerning the eastern half of the northern line of watershed, will be most conveniently connected with Cuttack and the Mahanuddy, when describing the concans of the eastern coast. We pass on, therefore, to speak of the great western watershed of Southern India and its physical dependencies.

The Western Ghâts.—The Western Ghâts are seen as a mountain-range best from the Payan-ghât, or as we prefer to call it, the concan, below. To the east, their altitude is carried far into the Deccan by subsidiary ranges and table-lands.

The following very general statement of the geological formation of the region is necessary to comprehend the features of the scenery. In the Jurassic era, while as yet India was a great lake, an immense outflow of granite and kindred rocks took place. At a subsequent period of depression, all the west and central parts of the present country were covered over by an influx of trap, chiefly basalt. And lastly a second great sheet of lava was injected beneath, perhaps indeed more than one, and raised the granites and their superimposed basalts to their present level. Thus, where the action of the sea, or of rivers, has laid bare sections of these formations, we have the edges of the different layers of basalt alternating with the masses of granite. When the latter is at the surface, it is characterised by huge dome-shaped hills; and when the top is formed by one of the sheets of basalt, its flatness is impressed upon the scenery, and either plateaux occur, or, if several sheets are exposed in succession, a series of terraces projecting below each other like steps. The basaltic formation prevails over nearly 250,000 square

miles. This immense area includes the table-land of Malwa, the Vindhya system, and, in part, the Western Ghâts, extending eastward from the latter to Nagpore, but stopping short of the granitic plateau of Mysore, on the south. Its decomposition produces the famous black cotton-soil of India, locally termed "Regur."

The general elevation of the Western Ghâts varies from 500 feet to 1000 feet above that of the Deccan to the east of them. Their absolute height is occasionally 6000 feet, as in the highlands of Coorg; and Bannasoor Hill is 7000 feet high. They always form a background of blue mountains to an observer on the coast of Malabar, but do not in general present a rugged outline, because they are often capped with basalt. On a closer view they afford abundance of variety. At one time their rapid ascents are a mingled and tumultuous mass of hills and rocks, now bare, now clothed with luxuriant forests. At other times they rise into magnificent walls, continuous for miles, which even the abundant moisture of the south-west monsoon cannot fructify. At the Ahopeh Pass, due east from Bombay, is such an escarpment 1500 feet in perpendicular height, and others occur of double that enormous altitude, and are therefore among the loftiest known precipices in the world. Again, we have the beds of lava alternating with those of amygdaloid and other compounded rocks, and the blank wall of the one rises out of the sloping talus of the other, which being covered by forests, is opposed alike in outline and colour. Occasionally this alternation happens three and four times in succession, and the black walls of basalt are distinguishable at a great distance from the verdant bands of granite. When, moreover, the basaltic strata are columnar, as sometimes is the case, this combination acquires an additional interest, and we endeavour to imagine the scenery of our own Giant's Causeway many times enlarged, as we read of the occurrence of double rows of gigantic columns of basalt in a magnificent mountain scarp 4000 feet above the sea.*

Mountain Roads.—Such a mountain chain as this would

* Lieut.-Col. Sykes. Geol. Trans., new series, vol. iv.

seem to present an impassable barrier to communication between the countries separated by it. In truth, it would entirely do so, were it not that at wide intervals it puts forth vast salient angles far into the concan; and by taking advantage of their somewhat gentler slopes it may, with difficulty, be scaled. A glance at the nature of the roads thus made will help us in forming a correct idea of the character of the mountains. The most celebrated of these roads is that by which Poonah is reached from Bombay. It is the only one which is "metalled" throughout—a description which implies that it is passable during the whole year. It was intended as a military road connecting the capital with Poonah, near which city the Governor has an official hot-weather residence. We forbear to dwell on the minor inconvenience of getting from Bombay to the mainland at Panwell, and the fact that some of the concan-streams are not bridged, though flooded during the rains, and come at once to the great feature of the road, the Bore Ghât, about 30 miles from the coast. Here an ascent of 2000 feet is made in four miles by a series of winding zig-zags presenting one continued lift for the men and animals employed upon it. Travellers never drive up or down in their carriages. The latter have been pulled up empty, but it is considered a hard day's work for the horses. They are commonly drawn up and let down by bodies of coolies, or are slung upon poles and carried up on men's shoulders; while their owners betake themselves to palankeens or to ponies. Passengers by the public conveyances make the ascent of the ghât in a similar manner, leaving one vehicle at the bottom, and entering another at the top. Constructed to unite the head-quarters of two divisions of the army, this road has drawn to itself a large portion of the commercial traffic of the upper country, from its being the only safe means by which wheeled-carriages could cross the ghâts, throughout a space of 500 miles. But an obstruction like the Bore Ghât must add greatly to the cost of transit, merely by requiring a draught power altogether disproportionate to the wants of the rest of the road. On the other hand, the expense of making such roads is enormous:

and when they are completed, the contest with nature for possession of the narrow line thus wrested from her grasp has to be constantly renewed. During the months of May—Sept. 80 inches of rain fall in the lowlands, and often 130 inches. But this is a small amount compared with that which deluges the mountains. At Mahableshwar, for instance, 4700 feet high, not less than 280 inches occur yearly; and 24 inches have been recorded in a single night. These floods of rain find the roads most convenient sluices, and convert them into the beds of furious mountain-torrents, falling 600 feet in a mile. We may imagine the despair of the surveyor when contemplating the condition of his beautiful macadamized road at the end of the rainy season. This periodical destruction is now obviated by a simple but most ingenious contrivance. At about every 100 yards a small embankment is made across the road by loosening the earth and stones. It is a foot wide, and, being but three or four inches high, offers little hindrance to the traffic. It is cut diagonally, and intercepting all the surface water for 100 yards above it, conveys it to the side drains before it has acquired sufficient volume and power to do mischief. Gangs of labourers are employed to repair the little embankments as required, and at the end of the rains the ordinary traffic soon reduces them again to the level of the road. By this means, the violent drainage of the hills is rendered comparatively innocuous, and the road remains fit for use throughout the year.

Trending more to the south is another road which reaches Sattara by the Mahableshwar Ghât. The western flanks of the mountains here present a two-fold ascent, as it is necessary to mount a formidable outwork before attempting the main pass. It is not a metalled road, and is principally used during the hot, dry weather, as a means of approach to the cool and fashionable retreat at Mahableshwar, where, at an altitude approaching 5000 feet above the sea, the European inhabitants of Bombay may reinvigorate their health by breathing the rarified air of the mountains. The ascent is much worse than that on the Poonah road, and is popularly known as the Corkscrew Ghât.

Other roads ascend to Kolapoor and Belgaum, but the next safe communication is from Coompta to Dharwar, by a pass not greatly higher than the Deccan. A new road is in progress which will descend upon Sattara, passing up the Kartruj Ghât, and through a tunnel at the top, 800 feet long. From Tellicherry there is also a road across the hills by the Perumbady Ghât. This is considered the best in the whole range, and is much frequented, as it runs across the Mysore to Bangalore and Madras. It makes the ascent through mountains which are forested to their summits. Near the head of the pass the outer hills are left behind, and the scenery rapidly changes its character. The clumps of bamboos dwindle and vanish; the dense undergrowth fails; and then, with the lessened heat and diminished food, elephants cease to be encountered.* Finally, bare, rounded rocks of coarse syenite tower above the low jungle which skirts the track; and it becomes a sensible relief to emerge upon the well-cultivated fields and excellent roads of Mysore.

Concan of Malabar.—It has been stated that "a concan" is the general title which we have applied to any low tract of country lying between a mountain chain and the sea. Thus, at the base of the Western Ghâts we have the Concan of Malabar. Its average breadth is 30 miles, increased to 60 miles at its northern end, where it widens into the plain of Guzerat. Its mean elevation is 100 feet, but it bristles with isolated hills and short ranges, whose height sometimes rivals that of the ghâts. The district containing Calicut and Tellicherry is especially well peopled and carefully tilled. The flat, sandy shores are lined with groves of cocoa-nut palms, and graceful arecas are almost as common about the villages. The jak-tree, and a peculiar slender kind of banyan, are attractive features of the scene, and overshadow the low mud huts, which are built with broad thatched eaves to protect the walls from the rains. Nearer the ghâts are rounded hills of no great

* The newly-arrived Englishman, in India a "griffin," contracted to "griff," soon learns the significance of the word "Ani," an elephant, pronounced by the native guide with bated breath and terrified gestures.

height, but covered with the brightest verdure or with useful timber trees. In the hills above are the famous forests of teak and sandal-wood, where cardamoms grow wild, and the pepper-vine twines its delicate tendrils up to the topmost branches.

Further north, much sandy soil prevails, which does not lend itself to the construction of tanks and canals, and the country suffers in consequence from the extremes of moisture and drought. In the neighbourhood of Bombay is a more retentive soil, and fine crops of rice are produced. And, by degrees, the rich lands of Guzerat are spread out, to which all that has been said of the most fertile parts of Tirhut and Lower Bengal applies with equal truth. Extending all round the Gulf of Cambay, their slope towards the sea is imperceptible, and the tenacious surface soil frequently collects the superfluous rains into jheels, or natural tanks, which, like those of the Terai and of the Soorma-delta, swarm with aquatic birds of many species. The deep alluvium bears the richest crops. Seen in December, the cotton fields are just coming into flower; tobacco is two feet high, growing abundantly near Cambay; wheat is peeping above the ground, having been sown since the hot-weather crops of oil-seeds and grain were reaped. Patches of luxuriant sugar-cane are plentifully interspersed; and scattered over the plain in boundless profusion are magnificent trees—tamarinds, mangoes, and thousand-rooted banyans.*

Great cities occupy this fertile district, such as Baroda, Ahmedabad, Baroche, and Surat. It also possesses numerous ports, for, besides the two last-named places, there are Tankaria and Cambay on the north, and Khoon and Gogo on the western shore of the gulf. The rushing tide, indeed, coming in with the violence of a bore, would inevitably swamp a vessel caught by the ebb upon the mud; but (as in the Sunderbunds under similar circumstances) the resource is to make the coast voyages by tides, and secure a berth in one of the many safe creeks, for the time of low water. The chief disadvantage seems to be the want of good

* Sir E. Perry.

roads. We are told by an eye-witness* that the road is often at the bottom of a nullah, or dry water-course 30 feet deep, and so narrow that only one cart can pass at a time, and this for a mile continuously. The same writer gives diagrams of multiple roads, each in effect a nullah, formed in the light soil merely by the traffic; that is to say, the road is worn into ruts so deep and big that each becomes a sunken track, in which carts may pass each other without being mutually visible. This description of road is said to be most usual in the vicinity of Surat.

Proceeding from Guzerat northwards, beyond the influence of the Vindhya Mountains and the hills of Kattiwar, the country rapidly shows the want of moisture in the dry season; and for 100 miles south of Odypoor is then a barren waste. The usual astonishing change, however, ensues upon irrigation.

The whole western coast of India is deficient in first-class ports. Bombay, indeed, has a good harbour, formed by several islands disposed as a breakwater, and on one of which is the city. Its fine dock and building-slips are unrivalled in India, and the anchorage is fitted for vessels of the largest size. But Bombay itself does not at all compare with Calcutta in imposing appearance; and the "new town" is liable to distressing inundations from the tide. Except this port, there are none others of consequence on the western coast of India, till we arrive at Cochin. Several small harbours exist, such as Mangalore and Beypoor, but the bars at their entrances have only about 10 feet of water at ordinary tides. A port named Shedashegur, near lat. 15°, has been well spoken of. Here a new pier is to be constructed, and the road over the hills to Dharwar finished, when it will communicate with an important cotton-growing district. Cochin harbour has 20 feet of water on its bar, which might be considerably increased by the use of proper dredging and other operations. But the peculiarity of the port consists in a bank of mud several miles long, and about one from the coast, which increases in consistency with the rough-

* Mackay's 'Western India.' 1853.

ness of the weather, and, while permitting the passage of vessels through it, forms a natural breakwater to a fine roadstead within, where the anchorage is perfectly sheltered by this apparently insecure and probably unexampled protection. A long, narrow piece of back-water extends from the harbour, separated from the sea by a sand-bank, by means of which the country boats carry on a traffic for 40 miles from Cochin; and, with some artificial aid, this navigation might be readily extended to Ponany, 20 miles further.

The Southern Hills.—The town just mentioned lies at the entrance to the singular Gap of Paulghautcherry, or Coimbatoor, an opening that seems specially designed by nature for the passage of a railroad from coast to coast. At its narrowest this valley is twelve miles wide. Everywhere it abounds in fine scenery. About Coimbatoor there is much cultivation, this being one of the few spots in India which receives the benefit of both monsoons. Of the mountains of Travancore to the south of the Gap, very little is known. They divide the narrow concan on the west from the broad plains of Trichinopoly and Mádura on the east and south. The latter are remarkable for the rich fertility of the soil, and are under a good system of irrigation, though it is capable of further improvement. Towards the north, the lower country is much encroached upon by elevated masses lying between them and the Neilgherries. These hills have of late attracted much attention, as they possess a climate probably fitting them for the continuous residence of Europeans. The Shevaroy Hills are a pertinent example. They overhang Salem on its western side, and average 4600 feet in height. The climate is most delightful, and reported to be well adapted for invalids suffering from pulmonary complaints. The English residences are at Yercaud, near to broken and jungle-covered ground; but higher up, the hills have a grassy surface, said to be much better suited for a sanatorium. The healthy, rosy complexion of European ladies and children who had not been down in the plains for years, is especially noted in the reports. Coffee plantations are gradually covering these hills, adding to

their salubrity, although the breaking out of fever in 1854 was traced to the great quantity of fallen jungle allowed to rot upon the ground.* The Baramahal Hills (2000 feet) compose a table-land with which the Shevaroys are connected on the north, and the Pulney Hills (7500 feet) are a similar range near Trichinopoly; both these afford sites that are admirably fitted to become hill-stations for troops, and places of resort for invalids and unacclimatized persons.

The Neilgherries.—We turn to the much better known stations on the Neilgherries. Ootacamund is 7360 feet high; Kotagherry, to the east, 6570 feet; and Coonoor, to the south, 5886 feet. The culminating point of the plateau is Doodabetta, overhanging Ootacamund, and 8760 feet high.† Among these hills there are three different climates at as many elevations, and by judicious migrations it is possible to escape the rainy season altogether. Ootacamund has an unsurpassed climate, which has been compared to that of Malvern; the maximum heat is 77° Fahrenheit, and the minimum 38°. In October the mean temperature is 55°, and seldom above 60° in the shade. The nights are frosty, so that fires are necessary; and, though the sun is hot in the warm season, yet sun-strokes never occur. Fuel was at one time scarce, but good peat is now obtainable at 2*s*. 6*d*. a ton. The population has increased from 9300 in 1848, to 56,900 in 1856. And where there was formerly only a jungle tenanted by elephants, tigers, and other wild animals, there are now plantations of coffee and *Cinchona*, and fields of wheat and potatoes. All European vegetables thrive, and apples and pears improve by the transplantation. Both barley and hops are grown, and excellent beer is brewed from them. South-Down mutton comes to perfection, and the Englishman rejoices at once in good meat, and an appetite to relish it. Tea has been tried at Coonoor with success; though it does not thrive so decidedly as coffee, the cultivation of which, above 4000

* Report of Insp.-Gen. of Hospitals in India. Pub. in 'Madras Spec.,' Feb. 8, 1859.

† Mr. G. H. Fenwick, an engineer on the Madras and Beypore Railroad, makes all these heights 1000 feet greater. See his evidence.

feet, is said to pay 100 per cent. on the outlay. Some difficulty is experienced from want of labour, but here, as elsewhere in India, it is questionable whether an exceedingly low rate of wages has not been offered. The hillmen often belong to the ancient Toda race, whose faces and forms are very models of symmetry. They possess large flocks, and herds of buffaloes with immense horns; and roaming from pasture to pasture, live in temporary huts of the waggon-tilt form.

The railroad from Madras by Salem to Beypore, will bring these hill-stations within easy reach of the coast. At present the route passes over good roads from Bangalore. But there is a terrible ghât to be mounted. At the bottom of it is a vast extent of tiger jungle, where torches and fires are used at night to keep off the wild beasts. It is an undulating country covered with the densest vegetation, and the roads are bordered by fine trees and brilliant flowers. Then the Segoor Ghât ascends like a gigantic wall, rising nearly 1000 feet in a mile for six miles without a halt, and requiring four bullocks to drag up an ordinary "transit."* The change of aspect and temperature is soon manifest. After thirsting in the plains below, already parched to dryness in October, it is pleasant music to hear the bounding waterfalls by the road-side. The visitor from Madras revels in a temperature at least 12°, often 20°, cooler than that he has left, and takes his accustomed walk in early morn with astonishing vigour, for he requires exertion to keep himself warm. He passes whole hedges of roses and scarlet geranium, and houses draped in fuschias. In the gardens, apples and pears are in blossom, heliotropes are shrubs, and a veritable furze-bush is a mass of gold. In the open country, every hollow and ravine is filled with clustering trees, and the round-topped hills are covered to their crests with rhododendrons 20 feet high; orchids and ferns here hold their court, encouraged by the moisture of the frequent clouds; and common docks and thistles bring the fancy back to home again.

* The Coonoor Ghât, on the south, passes between magnificent overhanging precipices, of forms and colours which no imagination would dare to picture.

Mysore.—From the summit of Doodabetta a magnificent view is obtained, the clouds permitting, over hundreds of square miles of mountain and plain. We must pass on to describe the table-land of Mysore, lying about half-way down to the north-east. This plateau slopes gently towards the interior of the Deccan, until it is depressed to an average height of 1500 feet. Mysore has a population of 4,000,000, and comprehends an area of 30,000 square miles. Enormous portions of it are waste jungle, especially in the upper parts, where it approaches Coorg. Yet the soil frequently produces coffee of first-rate quality, maintaining, it is said, a price in the English markets equal to that of Mocha. Land of this sort is sold at public auctions by the native government, free of land-tax, but subject to an excise duty upon the coffee when grown. It should be observed that since 1832 the British Resident has been virtually the ruler, and under his influence the taxes have been abolished, and the roads made which render this province so preferable as it is for European settlement. Both the black and red cotton soils of India occur, and cotton of an excellent fibre, but short-stapled as usual, is produced. The sugar-cane thrives prodigiously under irrigation from tanks which extend for miles together, and the ubiquitous oil-seeds and pulses of India are similarly prolific. Wheat, and hemp cultivated for its fibre, are cold-weather crops, although the common flour is "ragi," probably obtained from *Eleusyne corocana*. Merino sheep were introduced by the Resident, Sir Mark Cubbon, and the exports of wool are yearly increasing. Iron ore is abundant; and for once labour is cheap. The only thing wanting to develop the resources of the country appears to be English capital; and this, with all the advantages which are held out in Mysore, must certainly ere long be attracted to it. It is right to add, however, that fever is to be expected at the beginning of the rains, and is certain upon opening waste jungles. But English settlers are increasing, and the bracing Neilgherries are within an easy distance.

Nagpore.—Still proceeding northward, we may include the large remainder of the Deccan in one description.

This region is best subdivided by reference to its three chief rivers and the intervening watersheds. From the Western Ghâts broad spurs are thrown out to the south-east, which sometimes fill the whole country, and compel the river-beds merely to divide them by narrow defiles. Of the chief of these are the Nirmul Range and the Sholapoor table-land. The former projects like some great promontory into the space between the River Godavery and its tributary the Wurdah. Steep towards the south, it is ascended by a fine ghât, about six miles from Nirmul, which leads to its flat top of black soil, 40 miles across. Nagpore is on a similar plateau, with an elevation of 900 feet. This falls, in one direction, to the Wein Ganga, which runs in a broad valley with isolated hills scattered over its level surface; while in the other, to the west, the country rises by several steps of 200 feet and 300 feet, until it overhangs the Wurdah in magnificent precipices.

On the other bank of the Godavery is a still broader range, also extending the dominion of basalt far over the granitic foundation of the Deccan. It is remarkable for the terraces formed upon its broad flanks. Thus, Ahmednuggur, 2130 feet above the sea, is situated on a second terrace; and at another place named Munchur we read of five such terraces in succession. These table-lands are all capable of the richest cultivation, and only do not receive it because of the long misgovernment to which the country has been subject, and which has not yet been corrected by British influence or rule. To this is to be ascribed the poverty of the people, the want of roads, and the disrepair of such tanks and water-works as are in existence.

The eastern side of the Ghâts themselves is a very hilly country, intersected at every few miles by a river-bed leading to one or other of the main drains of the Deccan. The road from Poonah to Dhawar, cities less than 300 miles apart, crosses nine formidable ranges and more than 40 streams, all torrents in the rainy season, and eight of them broad rivers. On this line of road, the Babdeo Ghât, eight miles south of Poonah, is celebrated even here for its frightful gradients and sharp angles, on

the edge of cliffs which are scarcely protected by an uncemented wall. In order to improve the road, one plan is to keep it always covered with loose stones, which serve to check the descent, although they must add materially to the upward draught. The alternate basaltic and granitic structure of the Ghâts is seen to great advantage among these hills. The mural precipices of basalt also form the great strength of the hill forts which characterize that formation. Such are Singhur, near Poonah, 4160 feet high, and Poorundhur, 300 feet higher.* Wherever this capping of basalt is much exposed to the weather, it displays a great tendency to wear into vertical seams, giving it a rudely columnar appearance. In this manner are produced numerous fantastic forms, which the imagination terms spires and towers, pillars, and other known objects, and which strongly increase the picturesque nature of the scenery. This assistance is often wanted, for except on the banks of the Godavery, forests are scarce in the Deccan, and barrenness predominates.

Rivers of the Deccan.—The upper waters of the river just named flow through very rich districts. Thus the Wurdah and Godavery itself drain the great cotton country of Nagpore, of which Oomruwutty and Hingenghat are the great emporia. And the Wein Ganga is equally celebrated for the richness of its iron-ore. The united stream afterwards drains a diamond-producing district, and breaks through the gneissic range on the coast of Coromandel; where, however, isolated basaltic hills occur even in the delta, with the usual improvement of the soil.

The River Kistnah rises, like the Godavery, upon the very crest of the Ghâts, and flows first through a rich black-soiled country for a considerable distance, and then on o the granitic plateau to the east of it. This region allows the surface water to percolate into it; and hence almost the only streams are the Munjerah falling northwards, and the Mussey into the Kishnah. On the latter tributary is Hydrabad, the capital of the Nizam's territory (about as large as the British islands), and near it are the once famous diamond mines of Golconda.

* Such too is Gwalior, in Central India.

The Pennar flows over a flat valley of black and saline soil, the result of decomposed basalt; and huge flat-topped masses, capped with this rock, limit the plain on both sides. Cuddapah is the principal town in this basin, whence roads extend through difficult passes to Bangalore and the southern highlands. Both the Pennar and the Kistnah force a passage through a range called the Nulla Mulla Hills,* where the pass of the latter is 70 miles and that of the former 150 miles in length. They are continuous narrow valleys, confined by walls of limestone with sandstone cappings, and abounding in wild scenery.

These Nulla Mulla Hills extend southwards towards the Neilgherries. Between them is the gap by which Bangalore is reached from Madras. The former town is 2900 feet above the sea, situated in the midst of an open country sprinkled over with rounded hills. The district has rather a monotonous aspect. But being only 126 miles from the Vellore railway station, and thus easily accessible from Madras, it is in high repute among Europeans residing on the hot coasts. As the influence of the south-west monsoon is felt here, a moister and cooler climate prevails and greater verdure covers the hills. Maize-fields extend in every direction, shaded by mango-trees full of monkeys and parrots; and the gardens produce all English vegetables in abundance. The European residences are so numerous, that with the churches, schools, &c., they constitute quite an English town. The native city was built by Hyder Ali, and the fine fort in its vicinity is a good example of Indian architecture. A very wild and romantic country lies between this station and Mysore. In the other direction it is a continued descent through the Moogly Pass till the railway is reached. Sometimes, indeed, the road assumes the steepness of a ghât, and additional cattle are required to draw up the conveyances of travellers. The pass itself winds through well-wooded ranges of mountains; but on the Bangalore side the country is characterized by isolated hills, often in groups of two and three, frequently barren, and at times suggesting the idea of gigantic heaps of rough stones. In no part does this shattered eastern

* Also known as the Eastern Ghâts.

chain of hills appear to rise above 3500 feet, and its altitude is usually much lower. Besides the valuable limestone which it produces, the range is completely charged with iron, and copper is found to the east of it. Unfortunately, the roads across it, except the one above mentioned, are almost as bad as those over the Western Ghâts.

Concan of Coromandel.—The eastern concan, or the coast region of Coromandel, is much wider than that on the west side of the peninsula. The capital city of Madras stretches along a bare sandy shore, which rises slightly to the Pulicat Hills, for the Ghâts are too far inland to be visible. This place labours under the great disadvantage of having no port; a terrific surf lashes its shores, and upon the approach of the north-east monsoon all vessels are warned by signal to leave the exposed anchorage.

Irrigation of Deltas.—Without irrigation, the concan is a barren sand, or pestilential jungle; with it, it is productive beyond belief. The 70 miles of railroad from Madras to the Ghâts is one continued embankment in the midst of rice-fields, which, when irrigated, look like an immense lake. And, in truth, the chief interest of these coasts for us consists in the extent of the irrigation-works and their results. We shall therefore compare briefly the great deltas of the Cauvery (or Coleroon), the Godavery, and the Mahanuddy, each about 2000 square miles in extent, and connected respectively with the towns of Tanjore, Rajahmundry, and Cuttack.* The undisputed facts are of extreme significance. The works required for improving these deltas are of three kinds, which are carried on simultaneously, viz., bunds, or embankments, to retain the streams in their course and prevent inundations during the rains; weirs, or annicuts, as they are termed, thrown across the main streams near the head of the delta, for the purpose of damming the water back, and thus storing the superfluity of the wet for the wants of the dry season; and, lastly, canals, in addition to the streams of the delta, fed from openings in the annicut, to irrigate the country

* See Evid. of Capt. Haig, before Com. of H. C., 1859.

below, and, being at the same time navigable, to supply the place of roads.

The district of Tanjore came into our possession in 1799, and it had previously been furnished with fine irrigation works by the native Governments. But in 1836 these works had become almost useless, owing to their neglect, and in part also to changes in the course of the River Cauvery, which the nature of the works was not calculated to meet. The Madras Government sent Col. (now Sir Arthur) Cotton, whose name is identified with successful irrigation in India, to report upon the case, and two weirs were constructed. Other improvements, costing about 4000*l.* a-year, have been steadily carried on; and in 1857 the Colonel reported that the profit to the Government in increased revenue was 200*l.* per cent., a return which was disputed before the Board of Revenue, and reduced to 118*l.** In the meantime the value of the land has increased three-fold, and the population of Tanjore is now confessedly the wealthiest and most thriving in Southern India. Yet these works are far from perfect; the irrigation-waters are barely sufficient for one crop, and there are no canals of navigation, although the latter defect is partly remedied by better roads than usual. The records of the years 1834-57 put the advantage of these improvements in a very strong light. In that period the Concan experienced three years of actual famine from failure of water, and four of drought, seven moderately good years, seven of inundation, and two of severe flood; whilst Tanjore was enjoying a regular supply of water the whole time and complete security for its crops

In Rajahmundry a larger outlay has been made in a shorter time, and the effects are correspondently decided. The works were commenced in 1846, and by 1851 a solid annicut had been thrown across the stream, side-bunds made, and preparations advanced for canals. In 1859, there were 1000 miles of navigable canals; and the region directly and indirectly affected by them extends over 5000 square miles, containing a million of people. The works are still incomplete, and are expected to involve

* Haig. Q. 4301.

a total expenditure of half-a-million sterling. The results already achieved are probably the most astonishing in the annals of improvement. The yearly revenue has increased 16 per cent., *i.e.*, 80,000*l.*, and the income of the district upwards of 400,000*l.* The cost of transit has been reduced to one-half of what it was, and the internal traffic enhanced thirty-fold. Whereas, before the improvements, the district bought food to the value of 22,000*l.* per annum, it now exports rice and other agricultural products to the yearly amount of 300,000*l.* Capt. Haig estimates the cost per acre at 7½*d.* per annum. This includes all repairs and the interest of capital. The increased tax has been less than two rupees per acre, and for this the ryot obtains water enough for two crops a-year, and all the additional means of transit; and while the product of a dry acre is worth 18*s.* that of an irrigated one is valued at 46*s.* It is not to be wondered at that signs of wealth are fast increasing; the ownership of land, the furnished houses, the well-dressed ryots, the abundance of gold and silver ornaments, are so many unmistakeable evidences of a prospering people. No figures, says an eye-witness of the famine in 1853,* can convey a true idea of the priceless blessing conferred by these works upon the people of the delta. In May, I was on the banks of a large branch of the Kistnah, then a sheet of sand: there were no signs of vegetation; the cattle were dying in numbers, and the poverty and wretchedness of the people were extreme. In June, I was encamped nearly 30 miles from the Godavery; water and forage were abundant; and the stream from the head-sluice 50 miles above my position flowed past, and was enlivened by the frequent passage of boats heavily laden with the produce of the district.

Orissa.—The province of Cuttack or Orissa presents a great contrast to these pictures of prosperity. The population is thinner and more wretched-looking than anywhere else in India, and the jungle-covered wastes are so pestilential that Europeans run the greatest risk in settling there. Little or nothing has been done towards improving

* Mr. Lushington, Collector at Musilipatam. See Capt. Haig's Evid. Q. 4247.

the natural condition of the delta. No bunds prevent destructive inundations; the abundant water-supply runs to waste, leaving the land to be parched up in the dry season; and no canals supply the means of communication, which ceases altogether during the rains. The result is that the revenue of 1834 is still that of 1857, and little more than one-sixth of that of Tanjore in the latter year. Land as fertile as any to be found in the other deltas is given over to jungle. The great heat and decaying vegetation produce fatal exhalations, and these diminish the population, and prevent the accumulation of that labour which might cut down the jungle and till the soil. While the Rajahmundry district is healthy for Europeans, with the customary visit to the hills, and the profitable cultivation of sugar, oil-seeds, and rice, is attracting English capital, that of Cuttack is too sickly for even the natives to thrive, and its great staple (rice) is subject to all the uncertainty of too much or too little moisture which characterizes this coast. In times of distress from such causes, the taxes are wholly or in part remitted, and during the 23 years before mentioned (1834-57) 23 lacs of rupees (a lac is 100,000), or a quarter of a million sterling, were thus lost to the Government. In strong contrast to this it is asserted that in the year 1853 alone the Rajahmundry works saved the remission of two lacs of taxes, and property valued at 400,000*l.*

It should be remembered that the above figures showing the increase of revenue in the irrigated districts include income from all sources, such, for instance, as arrack licences, and others which are indirectly connected with irrigation; and a deduction is also to be made for improved management of the revenue; but when all the possible abatements have been made, there still appears a profit of 40 per cent. on the outlay for water-works, and this, with other unchallenged statements, justifies the opinion that "irrigation is, in fact, the key to the material prosperity of the country, and with it to the social and moral improvement of the people."*

* Report of Select Com. of H. C., 1859. *Note.*—In the North, where only one-third of the land is irrigated at a time, one cubic foot per second is calculated to serve one square mile.

Among the last acts of the late Lord Canning was the sanction of plans for irrigation works to utilize the copious waters of the Mahanuddy, the Brahminy, the Byturny, and the Soobanrecki; and the consequent improvement of the wide territories drained by this group of rivers. The results may be anticipated with much confidence from the similar cases of Tanjore and Rajahmundry.

The Sunderbunds of Orissa are but a continuation of those of the Ganges; behind them is a level expanse of light soil, without a pebble, all capable of bearing rice; and inland to this the country rises in easy undulations of red clay to hills of teak and other forests. The River Mahanuddy is navigable for boats to Sumbulpore, the centre of a rich wheat district; and its valley is highly fertile. We cannot even enumerate the valuable woods of this whole region, nor its grains and pulses, its oils and fibres, dyes and tanning materials, of which samples were shown at the International Exhibition, which prove how great are its hitherto undeveloped resources.

Iron.—We turn to make some remarks upon two important products of South India, viz., iron and cotton. What we have termed the granitic formation in South India abounds in gneissic and other rocks, one of whose components is hornblende. The decomposition of this and felspar, another constituent, is believed to be the source of the "red soil," or "laterite," which covers immense areas, and is everywhere found in combination with syenite, hornblendic slates, and like rocks. The colour is given by iron, and the soil itself is a deep tenacious clay, sometimes becoming as hard as stone. Kidney-shaped holes often occur in it, filled with porcelain clay derived from the felspar. As a soil this laterite is very productive, but at present we are concerned with it in connection with iron. Wherever laterite prevails it is safe to predict the discovery of this mineral. The most common form of occurrence is as surface iron; rich ore, resembling hæmatite, being scattered over or near the surface of the country. This is particularly the case all over Malabar; and the Beypoor Iron Works are supplied with this ore, which is found to make admirable iron. Small hard-wood

for fuel is plentiful, and lime is obtained by calcining sea-shells. From the same source is the iron manufactured at Porto Novo, near the mouth of the Coleroon. It was here that in 1833 the first Indian iron for British use was made by a gentleman named Heath. His earliest attempts failed, but subsequently a valuable kind of steel-iron was produced. This iron is used in Sheffield, and so prized there, that if sufficiently abundant, it would probably stop the present consumption of Swedish iron.* The immense store of iron-ore on the Wein-Ganga has been already noticed, and the proximity of wood in ample quantities for smelting purposes. As an instance showing the unlimited supply, we take the following: near Dewalgaum, on the east bank of the river, in a level jungly country, is the hill of Khandeshwar, its distinctly marked stratification showing a dip of 60° to the north; it rises 250 feet above the plain, for 150 of which it is a bare perpendicular rock, and the whole mass, from an unknown depth, is richly laden with metal. The iron is mostly in the form termed specular, and some of it is said to be magnetic. Here is iron enough and to spare for all the wants of India, and this is but one case out of many. We may cite another from Calicut; within five miles of which town are two rounded hills entirely formed of cubical iron ore, yielding 75 per cent. of metal. In neither of these examples is the mineral worked; but it may be safely averred that when roads and canals cover South India, iron will be one of its most valuable productions.

Cotton.—The question of cotton is even more peculiarly interesting than that of iron. Although many other parts of India grow cotton, and under the pressure of high prices it may be expected that much more than before will now be cultivated, yet it seems agreed that for some years to come we must look to Western India for our supplies of cotton. During the last sixty years, the East Indian Government have been promoting measures for improving the staple of Indian cotton, and especially its preparation for market. The result of much expendi-

* Evid. of Mr. G. Atkinson, mayor, and Mr. H. Jackson, master cutler, of Sheffield. 1859.

ture, and the employment of experienced Americans, has been to indicate that foreign cotton is not the best suited for the soil and climate of India, and that the natives understand the cultivation of their own sorts very well. These experiments were carried on from 1799 to 1849, in Guzerat, Broach, and Ratnagherry, on the coast; in Candeish and Dharwar in the Deccan; and most recently in Coimbatoor, Salem, and Tinnevelly, in the south. The American short-stapled (New Orleans) cotton was the variety chiefly experimented upon, and this was found to succeed best in Dharwar, in consequence, Dr. Royle thought, of that district receiving to some extent the rains of both monsoons. The distribution of foreign seed still continues, and in the South Mahratta country it is highly valued.

The indigenous cotton is said to surpass the American in whiteness of colour, in the readiness with which it takes and retains dyes, and in the peculiarity of swelling under the bleaching process, whereby a more substantial look is imparted to the manufactured goods. Though fine, it is very short, and before it can be substituted for the American article, our spinning machinery must undergo an alteration involving a cost of one shilling per spindle; also, when dry, the fibre is apt to break, whence the alleys between the machinery of the spinning-mills and weaving-sheds are frequently watered, in order to maintain a moist atmosphere. But the greatest defect arises from the dirt and other extraneous matters which are mixed with the cotton. The sowing takes place in June or July, as soon as the first showers have moistened the soil. The plants come up in a few days, and are repeatedly weeded and thinned. In December, the yellow flowers are in bloom, and by February the pods are matured and the cotton is ready for picking, which operation is continued through March and April. The cultivator of the soil in India is generally a poor man. His whole apparatus for cotton-growing, ploughs included, costs 15 shillings, and with a cart and a pair of bullocks, raising the total outlay to 100 rupees, the Guzerat farmer is ready to occupy and till 25 acres of land. In ordinary

cases he looks to his grain crops rather than to his cotton to feed him and pay his assessment. Hence, as they all ripen at the same time, the cotton picking is neglected; and if the grain is only reaped just before the religious festival which occurs in the beginning of March, the people can then hardly be drawn from their holiday-making by any consideration whatever, and thus several days more are lost. Meanwhile, should showery weather intervene, as it sometimes does, the cotton is shaken out of the pod and kneaded into the sticky earth till it becomes of a darkish-grey colour, which no after-bleaching will wholly remove. If, on the other hand, it is fine weather, the pod-coverings get over ripe and break away with the fibre, and very seriously damage its quality. The picked cotton, moreover, is stored in pits, open to the dews above and in contact with the damp sides; and as it is sold by weight, earth and stones are sometimes systematically thrown into it.* This amply accounts for the bad condition of the cotton in the market, as the dealer who separated the fibre from the seeds seldom cared about freeing it from other impurities. With European agents on the spot an improved mode of preparation will be adopted, and high prices will secure for cotton the attention of the cultivator. Steam-gins for separating the seed do the work better and faster than the native process, and the hydraulic press so hardens the bales that damp can scarcely enter them, besides making the article less bulky for carriage. And if to English supervision and capital there be added cheap means of transport to the coast, it cannot be calculated how far the cotton of India may go in a few years' time towards filling up the great gap caused by the cessation of our American supplies. But it appears idle to imagine that it will not take time to create a trade in India, like that which in America was the growth of half a century.

The average yield of cleaned cotton per acre is under 100lbs.; but it is stated that irrigation not only lengthens

* Mackay. The stones are now collected by our manufacturers, who obtain a drawback of 3*d.* a lb. for them from the cotton merchant.

the fibre, but raises the produce per acre to 300lbs. and even 600lbs. The greatest quantity of East Indian cotton sent to us in any year previous to 1860 was in 1857, when it amounted to 681,000 bales of 400lbs. each.* This was under the stimulus of a short importation from the United States. In reply to the present urgent demand, the land under cotton cultivation has been yearly increasing. And if we add the effect of the improvements partially carried out, we shall have a greatly enlarged production. This has been exemplified in Berar and Central India, and at Dhollera in Guzerat, which gives its name to a very large part of the Indian cotton in our markets. In 1863 the total importation was 3,878,000 cwts., so that the quantity received from India is already more than three times as great as in any previous year. Still it falls far short of supplying the vacancy caused by the withdrawal of American cotton, of which, in 1860, the year before the war, 2,580,000 bales were taken by us. But regarding the immense resources of India in this respect, it will in time, there can be no doubt, supply us with more cotton than we have ever received from the United States. Mysore and the concan of Coromandel, Cachar and the plain of the Ganges, and perhaps Scinde, will find it profitable to grow cotton for our manufacturers. And a more speedy supply than these regions can afford us may be looked for from the district of Nagpore in the Deccan, "the great cotton-field of India." Here are thousands of square miles of the rich, black cotton-soil, together with plentiful supplies of labour. If only the means be afforded of making the plunge from the Deccan to the coast, here most easily and largely might our cotton imports be increased. In a return published in 1853, the price of a pound of cotton at Berar is set down at $1\frac{1}{2}d.$, cost of transit 400 miles to Bombay (if a railway were made) equal $\frac{1}{2}d.$, and freight to England at 3*l.* per ton, another $\frac{1}{2}d.$ But a still cheaper conveyance will be found by water down the River Godavery, which is to be made navigable throughout a length of 500 miles, to

* Neil's Cotton Statistics. 1860.

within 30 miles of Oomruwuttee and Hingenghat. To this navigation there are three obstructions, caused by rocky shallows at distances of 80 and 100 miles apart, which must be overcome either by locks or canals; but whether this river can ever be made fit for steam navigation appears doubtful. As a collateral advantage of this improvement, we may anticipate that we shall also receive some portion of the abundant and excellent crops of wheat produced in the upper part of the Godavery, now sold at the rate of 1*s.* a bushel, and which might be landed in England before our harvest-time at about 34*s.* a quarter. With the navigation of the Godavery, the rise of Coringa to an important place of trade is certain, especially if it becomes a great cotton port, as in all probability it will. Thus, in a wonderful manner, the most direful war of recent, perhaps of any times, may be the cause of incalculable advantage to our fellow-subjects in India, by calling attention to the capabilities of that country, and forcing upon us for our own behoof the development of its vast resources.

English Influence.—The chief agencies which are at present helping forward this result, are the following:—

1. The increasing number of English settlers. Wherever a European resides, an improvement in the industry and trade of the place follows, justice is better understood, truth begins to be spoken, and a higher moral standard is introduced. Numerous opportunities have already been pointed out for the employment of capital. It may be added here that there are many openings for young men of good character and a fair amount of education, especially if they can speak, or are willing to learn, Hindostanee or Tamil. They are wanted as clerks and overlookers, and other responsible subordinates, by the English companies now organizing in India, such as those for the cultivation of tea in Assam and Cachar, for irrigating Orissa and navigating the Indus, for constructing railways and making iron. Private enterprises, also, for growing flax and rhea, cotton and coffee, are now becoming frequent, and require a considerable number of English superintendents. For unskilled

labourers there is no demand. The native labourer can be had for 3*d.* a day, and he is cheaper than the Englishman at 1*s.* 6*d.*, although the latter does four times as much work. It is questionable, also, whether he could endure the climate. But all skilled labourers, artisans, and machinists, are much in request for the numerous Government and other works now proceeding. To such as are not obliged to be exposed to the heat of the day, the climate need not be so serious an inconvenience as is sometimes believed. A man of the north, with fair hair and light eyes, of wiry constitution, and above all of temperate habits, is said, on good medical authority, to be the best adapted for service in India.*

2. The improvement of the means of communication. This has been so often introduced before that it now requires but one additional observation—namely, that the construction of *tramroads*, such as they have in Cornwall, ought to be more encouraged than it is. They are readily and inexpensively laid down; and while they would supply the urgent necessities of the present day, they might be gradually replaced by railroads, as their want became felt. Without intercommunication, we have a state of continued paradoxes: famine coexisting with superfluity; want of labour with distress for want of work; idle capital with waste lands and untold natural riches.

3. The more frequent use of the English language. We have an official map before us divided into 20 distinct tongues, some of which have several dialects. As these differently-speaking peoples are more drawn together, a common language becomes absolutely necessary. And English, as the speech of the paramount power, is naturally selected. Educated natives from all parts can best understand each other when using English. By degrees, also, the Roman alphabet, both printed and cursive, is superseding the use of the complicated and difficult alphabets of India; and a Bengalee friend at Calcutta writing to a Tamil at Madras would, in most cases, write an English letter. The natives display great aptitude for learning English, some being led by commercial views, and others

* Dr. Moore. See Evidence. Q. 3816 and 3896.

by the desire of imitating the leaders of rank and fashion. English is also more generally used in courts of justice, and in all the Government schools the English language and literature of the ruling race are now the basis of the education.

Under this head, as infusing an English spirit, might be placed the assimilation of Indian to British law. Undoubtedly, English settlers need not be expected if English justice is not administered; but for purely native courts the consent of the highest authorities recommends the adoption of a code, with short, practical processes, something like our county courts.

4. The more open profession of Christianity. A great change in this respect has occurred within the last few years. It has been remarked that in southern India, where the native Christians are estimated at nearly 100,000, no disturbances took place during the late mutiny. It is observed that the quick-witted natives have more respect for Europeans who are sincere in their profession. If every Englishman remembered his pledge to Christianity, that insolent contempt with which the natives are sometimes treated would not be manifested; and it should not be forgotten that under the influence of personal attachment many bright deeds of kindness illuminated even the foul darkness of the mutiny. In short, the only principle which can justify Great Britain as a Christian nation in assuming her present position in India, is that of "planting among her pagan millions the seeds of a nobler faith, and the example of a better life."

Imports and Exports.—The following tables represent the chief items of our trade with India, for the year 1860. The imports show an increase of eight millions sterling upon the average of the two previous years; while the exports continued nearly stationary.

	Imports. £.	Exports. £.
Bengal	20,717,598	12,903,770
Madras	3,000,846	2,492,156
Bombay	16,903,659	13,493,284
Total	40,622,103	28,889,210

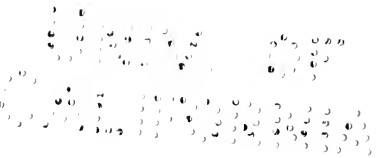
Principal Articles to India.	£.
Apparel	390,437
Beer, Spirits	652,837
Books, Paper	205,267
Cotton Yarn	2,014,916
„ Goods	9,447,307
Machinery	867,174
Metals, manufactured	936,523
„ Copper, Iron, Brass, &c., unmanufactured	1,597,453
Military Stores	1,022,602
Total of principal Articles	26,503,899

Principal Articles from India.	£.
Cotton, raw	3,889,159
Hides	328,750
Indigo	1,506,260
Jute-hemp	260,544
Oils	112,698
Rice	565,388
Saltpetre	328,837
Seeds	1,062,215
Shawls, Kashmir	201,098
Silk, raw	718,338
Sugar	780,400
Tea	111,106
Woods	185,279
Wool	417,151
Total of principal Articles	11,261,375

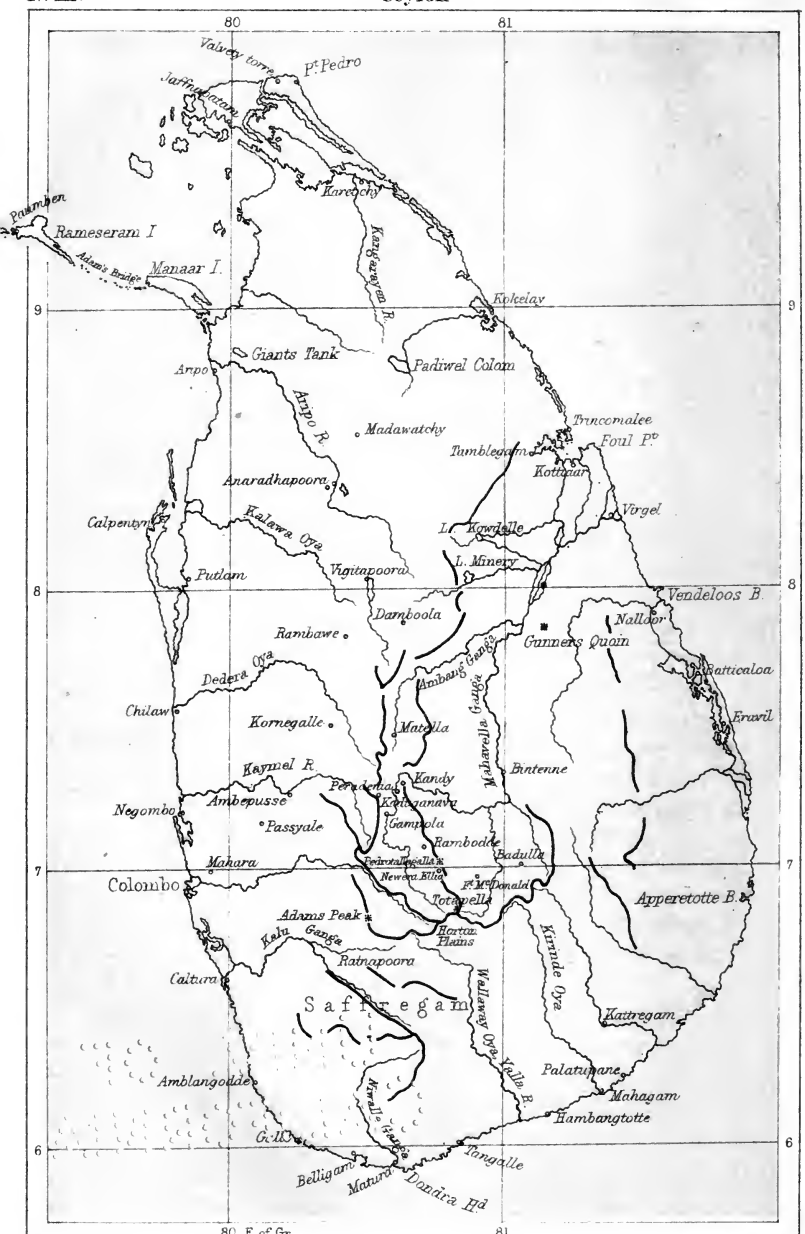
The next largest items of our exports to India are glass, earthenware, and coal. We also supplied beads of the value of 110,590*l.*, and the United States sent ice worth 23,900*l.* No less than eight millions and a half sterling of treasure came in from China and *viâ* Suez, much of the latter being from Great Britain.

The other chief export of India is opium, which was valued at 9,054,394*l.*, nearly all of which went to China. To the United Kingdom was also sent ivory and ivory-ware, worth 86,000*l.*, and about 50,000*l.* worth each of lac, coffee, and spicery.*

* Statistical Tables of Colonies, &c. Part viii. 1860. Published 1862.



Ceylon



Rev. Geo. Rowe Inv

Stanfords Geog.ˡ Estab.ᵗ

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CHAPTER VI.—CEYLON.*

Physical Geography: **The Mountainous Centre**, High Plains, Waterfalls; **The Hill Region**, Veddahs, Forests—Epiphytes, Palms, Pátenas; **The Lowlands**, Jungle, Mahawelle River, Trincomalie, Jaffna. **Productive Industry**: Palmyra Palm, Tobacco; Salt; Cocoa-nut Fibre and Oil; Cinnamon; Rice, Tanks; **Coffee**; Minerals. Population.

Ceylon.

Position; Size.—This celebrated island is separated from the south-eastern shores of India by an arm of the sea, which at its narrowest is only 40 miles across. At this point it is contracted still more by a line of rocky islets and sandbanks known as Adam's Bridge. This divides the passage into the Gulf of Manaar on the south, and Palk's Strait on the north, between which there is communication by vessels of light draught through apertures in the line of reefs.

In length and breadth, Ceylon may be compared with Ireland, the former being 270 miles long, and, in the latitude of Colombo 150 miles broad; but in consequence of its pear-like shape, its area is returned at one-fourth less than that of Ireland, or at 24,700 square miles.

The island is approached by the European voyager from the south-west; and if he fails to detect the spicy gales which have been supposed to indicate its neighbourhood, yet it must be admitted that he receives his earliest impressions of Ceylon (and frequently of India also) from a very favourable point of view. For the scenery about Galle is strikingly picturesque. The beautiful

* Baker's 'Eight Years,' and 'Rifle and Hound in Ceylon;' Sir E. Tennent's 'Ceylon;' Parliamentary Papers; Private Information, &c.

harbour, alive with shipping, is surrounded with dense masses of tropical vegetation, half concealing the town, and among which the luxuriant foliage and graceful forms of the cocoa-nut and Palmyra palm stand pre-eminent. The more distant hills rise like the shores of this waving sea of foliage, and mounting in successive tiers, are in turn overtopped by the shadowy outlines of still higher elevations far in the interior. The luxuriance of growth, and the rich and varied colouring which characterize the scene, are often sought in vain upon the less favoured, that is, drier, coasts of the adjacent continent.

Physical Geography.—The physical features of Ceylon admit of a simple and natural division, in accordance with which the following observations will be arranged. There is, first, a central nucleus of rugged and lofty mountains. This is encircled by a broad band of hill country: which is again surrounded by another girdle, forming the low, and comparatively flat shores. This threefold partition, however, applies only to the southern and broader portion of the island, south of N. latitude 8°, since the whole northern part of it is occupied by an extension of the lower, or coast region. A traveller passing due east from Colombo, would cross over all three divisions in succession, and descend on the other side in reverse order; but a track similarly drawn from Calpentyn would not rise more than a few hundred feet in the whole traverse.

Mountain Centre.—It has been estimated that five-sixths of Ceylon consist of undulating country, and almost level plains; the remaining sixth is occupied by the mountains now to be described. The most elevated portions of these occur near the 7th parallel. Their general height is 6000 feet, but many peaks rise considerably higher. The best known is Adam's Peak, 7700 feet high, situated to the north of Ratnapoora; but several others exceed this in altitude, of which the most lofty is Pedrotallagalla, 8280 feet in height. It seems impossible to assign any general direction, or regular ground-plan, to these higher mountains, so utterly confused do they appear. Among the lower ranges more

order is manifest, though it is still rather of a comparative nature than absolute regularity. In the south-western parts the ridges are roughly parallel to each other, stretching from south-east to north-west. On the north, again, the offsets radiate from the central masses towards every point of the compass, and rapidly sink into the hill country below. Only in the direction of Trincomalie do more extended ranges occur, where they compose the western watershed of the Mahawelle Ganga. The central mass itself rears its vast proportions as one mighty mountain, and the rugged prominences of its flanks and crest form the thousand peaks which tower above the highlands, of which those just named are but the loftiest. Speaking geologically, the most frequent rocks belong to the gneiss formation. These are everywhere pierced by veins of granite and quartz, whence, to the peculiarly rugged features of each class is added the confusion caused by their violent combination. The internal skeleton of Ceylon, on which the features of the scenery are moulded, is, in consequence, of the most varied, but always violent, character imaginable. Hills are piled on hills, peak upon peak, in ever-changing intricacy, and ravines of immense depth fall suddenly and sheer from the clouds to the lowlands. The topmost summits are often so rugged as to be quite inaccessible, and even the last ascent to the apex of Adam's Peak is only accomplished by the aid of a chain and notches cut in the rock. In some cases the crest is formed by a perpendicular wall of slaty strata set up on edge, jagged and weather-worn atop into a crumbling ruin; at others, sharp pinnacles give rise to the most fantastic outlines. And in immediate contrast to these wild forms, some huge hog-backed hill carries the eye away in one long, smooth curve to the distant and gentler inequalities of the lower mountains. But among these also, at a nearer view, the same decided oppositions are seen to prevail; and, notably, gigantic and detached cylindrical masses of gneiss rise from the hill-sides in lofty magnificence. Kornegalle is situated under one of these, which is 600 feet high and three miles in length.

High Plains.—The depressions which occur among these highlands are frequently large enough to form undulating and somewhat level valleys, or basins, which are termed "plains." They exist at various heights, and an attempt has been made to refer them all to four elevations rising successively above each other. Viewed thus, the plains of Oovah, on the east, 4000 feet above the sea, will be the lowest in the series. At this altitude, however, the hill country commences, and these plains more strictly belong to it than to the mountain region. One of the loftiest is the plain of Nuwera Ellia, 47 miles south-east from Kandy, and 6300 feet high. Owing to its bracing climate, the station here has been converted into a sanitorium for the European inhabitants of the island. It is surrounded by mountains covered with fine forests, and the heaving ground which forms its surface is diversified by broad flats of grass and jungle, and intersected by streams. The lowest parts are swampy levels; but they are not sufficiently great nor permanent to affect the salubrity of the place. Very different in character from this are the Totabella Plains. These are composed of hundreds of grassy hills, rising in every direction, like enormous mole-hills; and around their bases are winding rivulets slowly passing to their turbulent outfall at the lower end of the plains. As another variation in the features of the scenery, we may refer to the Horton Plains, situated on the southern edge of the great mountain centre, which here plunges down 5000 feet in a few miles. They are 7000 feet above the sea, and are bounded by low hills, which constitute the actual summit. The plains are nearly horizontal, and the swamps contain the highest sources of the Mahawelle Ganga; smaller plains ramify from the main level, sloping down on all sides, except where a precipice, 100 feet in depth, causes a magnificent cascade.

Waterfalls are, indeed, so frequent as to constitute a marked feature of this mountain district. The gorges already mentioned, sometimes penetrate the rocks so deeply, and are withal so narrow and serpentine, that the water at the bottom of them can neither be seen nor heard. The swollen torrents from the hills pour over the beetling

cliffs which form the heads and sides of these fissures, and are obscured in masses of spray and foam long before they reach their bases. One of the finest of these falls occurs upon the road from Nuwera Ellia to Badulla. Here the mountains close in upon the track on either hand, and, at length, the advance seems completely barred. Then, a sudden turn brings the traveller out upon their eastern escarpment; the attendant stream sweeps grandly over a precipice, and the low country lies spread out beneath like a beautiful picture, whose colours fade away upon the horizon into the gleaming light refracted from the ocean.

Such, faintly sketched, are the chief components of this region. It is composed of every conceivable combination of crag, peak, and heavy swell, torn by ravines, and interrupted by wall-like descents of profound depth. It is adorned by falling water in endless variety, from the cataract of the foreground to the silver thread hardly traceable in the distance. And when we conceive all this clothed with a gorgeous robe of forests, which adapts itself to the constant change of ground, and penetrates into the most apparently impossible positions for the growth of trees, so that the eye is at once charmed by the colouring and satisfied by the sense of life thus introduced; then it must be confessed that few countries can compare for romantic beauty with the highlands of Ceylon.

Hill Region.—It has been said that these heights are encircled by a zone of hills. This is of much less altitude, and softer character than the mountain region, and is meant to comprehend all the country from 500 feet high, up to 4000 feet. Yet parts of this district are quite worthy to be compared with the former. Of the tract to the east of Badulla, Sir H. G. Ward, the late Governor, writes, "All that nature can do to make a country attractive, by the most beautiful combinations of mountains, forests, rivers, fertile valleys, and rich grazing-grounds upon the hills, is to be found scattered with a profuse hand over this space." The hills also which surround Kandy, the ancient capital, though covered with jungle, which disappoints upon a near view, are productive of very varied and much-admired scenery.

It is in this division of Ceylon that the varying results produced by the monsoon-winds are chiefly manifest. The south-west wind is much wetter than that from the north-east: hence the greater quantity of moisture which is deposited on the south and west sides of the island. As a consequence of this, the forest is more predominant in those quarters. On the eastern side, although by no means deficient in wood, the hill-region often presents large tracts covered with grass. Such occur in the Oovah district, of which Badulla is the chief town, situated itself in a lovely valley, which also abundantly fulfils the terms of the quotation just made. There is here a hilly country, 600 square miles in extent, described as resembling the Sussex Downs,—an open, grassy district, with rice-fields in every hollow. The allusion to home scenes is only true of the rolling outline of the hills, and the unusual absence of forests. The grass is exceedingly luxuriant, generally too rank for sheep to eat. Indeed, it is often "lemon-grass" (*Andropogon schœnanthus*), which abounds on the hill-sides. This grows 12 feet high, and has thick, succulent leaves, whose sharp edges are jagged with spines, so that a jungle of it is impervious to man. Yet it is the favourite food of the elephant. The leaves possess the flavour of the most pungent lemon-peel, whence its name, and from them is distilled a scented oil called citronelle, which is imported to Great Britain, where it is largely used in perfuming the so-called honey soap. In some of the less populated parts of this district the valleys are filled with scrubby bushes of wild guava, which is held to betoken poverty of soil.

To the north-east of the central mountains is a territory that, from its peculiar sparsely-wooded character, has been named "The Park;" and as it is occupied by the Veddahs, who are believed to be the last remnant of the aborigines of Ceylon, it is termed "The Veddah Park." Here the trees grow at a greater distance from each other than in the forest, yet not so as to fail in giving shade. Below, the entangled undergrowth of other woodlands is exchanged for a thicket of lemon-grass. In consequence, it abounds in game,—elephants and deer of several kinds,—whence it is in high esteem with sportsmen. The Veddahs are a

harmless race, but in the lowest state of civilization. They are said to possess neither a settled home, laws, nor religion*. Our ignorance of these people is, however, extreme, and their shyness and taciturnity is such, that the chance is small of our ever being better acquainted with them. They carry bows and arrows, but no firearms; and hunt deer and other wild animals, whom they allure by burning the grass every year after the wet season. They dry the flesh in the sun for future use, and pack it in a hollow tree with honey, which further preserves it. Travellers have fabled that they lived in trees; and this was thought to assimilate them very nearly to mere animals; but the story when traced to its source rather proves some lingering traces of a higher condition than their present one. The larger communities among them cultivate small plots of a grain called "korrakan," which supplies them with very indifferent bread; and to protect these from the elephants they build small platforms in the trees, where they maintain watchfires during the night. This prudent habit of the Veddahs gave rise to the legend of the men in Ceylon, who, like the monkeys, dwelt in trees.

Forests.—Although the chief importance of the hill-region arises from the industrial occupations of its inhabitants, to be treated of hereafter, yet it is also interesting as the zone of forests. It is true that they belong scarcely less to the central highlands; and large portions of forest-ground are likewise met with in the low country. But because jungle prevails to the greatest extent in the latter division, and not so largely in the other two, it will conduce to a clear view, if, without forgetting the remark just made, we refer the forests chiefly to the two higher regions of Ceylon.

When the traveller first sees a large extent of forest (as, for instance, from the top of Kaduganava Pass, on the road from Colombo to Kandy, where it is 1800 feet high), one uniform, dark screen of foliage appears to cover the whole view of mountain and valley, hill and dale; and it is only as he becomes acquainted with it in detail that the numberless phases which it assumes, changing with every alter-

* Baker.

ation of soil, altitude, and moisture, perplexes him in his attempts to arrange it for the purpose of description. In some districts, the poor, sandy ground affords scarcely any growth of underwood; and the tap-roots of the trees themselves penetrate to some more propitious subsoil. In other parts, so dense is the vegetation both above and below that it is almost dark in the depths of the forests, and not only is no game found in them, but even birds exist only on the outskirts. And again, an impenetrable, entangled undergrowth affords shelter from the heat by day to the wild animals whose nightly feeding-grounds are on the tanks and marshes: such are the elephant, the buffalo, and the wild boar; and their tracks are the only means of entering such forests. In the mountains, a frequent underwood is formed of a plant called "Nillho." It has a straight stem, from 12 to 20 feet high, and one and a half inches in diameter, with a few branching arms at the top. It grows as thick as corn in a field. Every seven years it blossoms, producing an abundance of bright, white and purple flowers, exceedingly handsome in appearance. These are the resort of innumerable bees, who build their nests among the stems; and this is the year for collecting wax. The flowers are succeeded by a seed resembling a sweet nut, which attracts swarms of pigeons, rats, and other small animals, who feed upon it. After this the nillho dies, and the wind blows it down; the dead sticks and poles lie two and three feet deep, through which the green young shoots penetrate and become the favourite food of the elk, or Samber deer. This animal is much and justly prized. It is the largest of the Asiatic deer; a buck standing fourteen hands at the shoulder, and weighing 600 pounds. But its chase among the nillho requires great physical endurance and determination, and is not always terminated by success.

Every shade of green is displayed in the forest, which also exhibit the most brilliant tints of yellow and crimson. This rich colouring is not produced, as in colder climes, by the decaying splendour of autumn, but by the budding glories of perpetual spring. The young branches assume the brightest and most varied hues. Among the larger

trees in the southern forests is the iron-wood tree (*Mesua ferrea*), the scarlet shoots of which are like huge clusters of blood-red flowers, and are conspicuous at a great distance. But gorgeous contrasts seem to reach their utmost in the foliage of some of the epiphytes, or plants which grow on others. One of these, an orchis, is named "The King of the Forest," whose leaves, we read, are of dark velvet, approaching to black, and reticulated all over their surface with veins of ruddy gold.*

The rank luxuriance of these wonderful epiphytes is the most striking phenomenon in tropical forests, and is displayed to perfection in those of Ceylon. "The trees of older and loftier growth," writes Sir Emerson Tennent, "are tormented by climbing plants of such extraordinary dimensions that many of them exceed in diameter the girth of a man; and these gigantic appendages are to be seen surmounting the tallest trees of the forest, grasping their stems in firm convolutions, and then flinging their monstrous tendrils over the larger limbs till they reach the top, whence they descend to the ground in huge festoons, and after including another and another tree in their successive toils, they once more ascend to the summit, and wind the whole into a maze of living network as massive as if formed by the cable of a line-of-battle ship. When, by and by, the trees on which this singular fabric has become suspended give way under its weight, or sink by their own decay, the fallen trunk speedily disappears, while the convolutions of the climbers continue to grow on, exhibiting one of the most marvellous and peculiar living mounds of confusion that it is possible to fancy."

Among the more remarkable trees in the lower districts are those of the fig genus, which contribute largely to the mass of complexity just described. These frequently rooting on other trees, are, indeed, but epiphytes of the most gigantic character, and have been aptly termed "the Thugs of the vegetable world." The fig, whose seed was first deposited among the leaf-stalks of some palm, by gradual extensions of its twining arms above, and its

* Sir J. E. Tennent's 'Ceylon.'

peculiar net-like roots below, at length completely encircles its supporting tree; and when it throws its large masses of foliage high above it on all sides, and the plume of palm-leaves stands enshrined in the bower of branches, the appearance is exceedingly beautiful, and is styled "the marriage of the Fig-tree and the Palm."* The banyan (*Ficus religiosa*)—the mightiest of all the figs—is in Ceylon an object of religious respect, and is planted by the side of every Budhist temple. The sacred Bo-tree (such is the native name), which exists at Anaradhapoora, is especially reverenced, and is visited by numerous pilgrims, who carry off its leaves for amulets. It is said to have been planted in the year 288 B.C., and is most closely connected by legend with Budha himself.

Palms.—Ceylon is rich in useful palms. Besides the cocoa-nut and the Palmyra palm, which belong rather to the coast, there are several others so important to the inhabitants, or to commerce, that they deserve a passing notice. The talipat or fan-palm (*Corypha umbraculifera*), often rises 100 feet in height, its summit crowned by a few enormous leaves folded like a fan, one of which, when spread out, will cover a semicircular space of ground 200 square feet in area. Among its many uses, the manufacture of paper from the leaves is one of the most important. The elegant Areca palm (*Areca catechu*) rears its slender stem 80 feet high, though but five inches in diameter. Its nuts are often erroneously called betel-nuts; but the betel-plant is a kind of pepper, the leaves of which are rolled up with a little lime of coral, a few slices of areca-nut, and a piece of tobacco. These ingredients form the compound which is almost universally chewed in India under the name of "Betel." Large exports of areca-nuts are made from Ceylon; the annual average quantity being no less than 3000 tons, which is a large amount to be composed of seeds no bigger than a nutmeg. The exporting value is about 15*l.* per ton. Another of the palms is the Kittool (*Caryota urens*), whose peculiar flexible stem is surmounted by a sombre crest of dark-green greyish leaves, looking almost like the droop-

* Compare 'Jamaica.' Pt. IV.

ing plume upon a hearse. Its tough and pliable wood renders it excellently adapted for making the "pingoes," or flat bows, about eight feet long, which a porter lays across his shoulder, suspending the weights to be carried at each end,—a method well suited for the country, where, till lately, roads for wheel-carriages were unknown. This palm also furnishes a useful article of commerce. Its black wood is formed of a number of fibres, resembling split whalebone in appearance, which run up the whole length of the stem. These when separated by maceration are exported to Great Britain, and are much in request among the brush-makers on account of their flexibility and toughness.

We can only enumerate a few of the other trees,—the Halmileel of the banks of the Mahawelle Ganga, from which excellent cask-staves are made; the sack-tree, the bark of which is beaten into a fibrous mat, a thin section of the stem, with the bark adhering, forming the bottom and sides of a sack; and the silk-cotton tree (*Bombax malabaricus*), whose crimson tulip flowers are followed by a long brown pod containing the flossy fibre so much prized for stuffing cushions, &c. Nor can we scarcely do more than allude to the many cabinet woods which are found in these forests, of which satin-wood and ebony are the best known. The latter is the produce of the country east and south of Trincomalie, and is distinguished in the forest by its sooty trunk. When the outer and comparatively colourless wood is cleared away, the reduced logs are still two feet in diameter, and from 10 to 15 feet long.* And we have by no means exhausted the list of trees useful to man; many more might be added, as, for instance, the luscious-fruited mangosteen; and the Jak-tree, esteemed both on account of its wood and its nutritious fruit, which closely resembles that of its congener, the bread-fruit tree of the Pacific Islands.

Patenas.—There is one other characteristic of the Ceylon forests which must not be omitted. In the very midst of them occur patches of open grass ground which are called "pátenas." They occur at all elevations, and are

* Sir E. Tennent.

of all sizes, from a few square yards to many thousands of acres; and the total extent of acreage occupied by these natural grass plains may be reckoned by millions. They are closely surrounded by the forests, which girt them in like a wall, and yet no perceptible change of soil can be detected. In the lower hills they are covered with lemon-grass; above 4000 feet this is replaced by more hardy and wiry sorts, but very rarely does a tree grow upon them. Their soil is a light loam of black colour, mere dust when dry; soapy and tenacious when wet. It is of very little fertility, and is never selected by the planters for the cultivation of coffee, although the natives have grown it upon the pátenas by manuring them from the first. Their aspect is so promising, and the cleared land seems so prepared by nature for a plantation, that the disappointment experienced has been all the more felt. Following a hint of Humboldt's, these singular spaces in the forests have been explained by supposing a fire to have destroyed the trees, and then, when the grasses had once covered the ground, they occupied it so completely that no tree-seeds were able to germinate, or were quickly choked if they did so.

To sum up what has been said,—the forests of Ceylon are deeply interesting on the following accounts. To the student of nature they offer a magnificent example of tropical vegetation in all its varied forms: in the intricacy of its detail, the intense struggle for life among its parts, the brilliance of colour, the strangeness of shapes, and the overpowering sense of its predominance. To sportsmen they present game so attractive as to have led them to undertake the voyage from England for the purpose of enjoying its pursuit. The economist beholds the valuable woods and fibres, fruits and drugs, which they produce in such profusion, and revels in the future, when these now hoarded riches shall be developed into articles of profitable commerce. While the pleasure is at least equally real of the man who professes merely to love what is sublime and beautiful, when he contemplates the magnitude of their elements, and the solemn silence of their recesses, or admires the many-tinted pictures which meet him as he

roams from among the palms and figs and timber-trees of the plains to the glorious rhododendrons which blaze beneath the highest summits.

Lowlands.—The remaining portions of Ceylon are occupied by what we have called the "lowlands," forming the flatter shores. These, towards the southern half, are 10 miles to 30 miles broad, but in the north the whole breadth of the island is included within this division. On the north-eastern shores, around Trincomalie, and for some distance on either side of it, the coast is peculiarly fine and bold. But as a rule, the low country adjacent to the sea presents very monotonous features, and an uniform jungle covers the undulations, intermingled with flat plains of grass. On a closer inspection, however, this uniformity is much modified, and in the interior, scenery of great beauty occurs. Still it is quite true that the charge of monotony is to some extent justified by the statements of travellers; even if the uniformity changes in different parts of the island. East of Bintenne, towards Batticaloa, the country below the hills is very flat, and completely hidden by the dense vegetation. Only at rare intervals can a clump of detached rocks be ascended, and then it is but to see the level forest stretching away in every direction to the horizon. The sole life of these dark forests are innumerable swarms of insects, which, in Ceylon, live everywhere and at all times. Again, on the opposite side, the coast, for a long distance around Arippo, is quite flat, and the soil barren. The surface is covered only by scrubby, thorny jungle, or stunted grass, and the extended line of coral shingle only diversified by the long banks of oyster-shells which have accumulated from the pearl fishery in the lapse of ages. Even the continuous grove of cocoa-nut palms which, with occasional breaks where the streams cross it, lines the whole south-western coast for 120 miles, becomes wearisome at length to the passenger between Galle and Colombo. But the flora of the western side is, for a reason already given, more luxuriant than the eastern, and resembles that of India in similar positions. Dark lines of mangroves stand out of the tidal waters; interior to them are screw-pines,

and trees having a succulent nature; and then, after a few miles, often much sooner, a thorny jungle extends itself over sandy plains and hills of clay alike.

What is called "jungle" is so prevalent that it is sometimes said to cover all the lower zone. It is variously named, according to the character of its vegetation. The "chena-jungle" is the most common, and consists of thick, tangled bushes, armed with a thousand hooked thorns, which defy penetration, and are worse, if possible, than the "Wait-a-bit" thorns of the jungle at the Cape of Good Hope. Sir Emerson Tennent informs us that the ancient kings of Kandy, to preserve their possessions in the interior from their enemies on the coast, planted the broad belts of this jungle along the forest's edge. This will account for a portion of it, no doubt, but for only a small part. Now it is the practice of the natives, especially in the south-eastern districts, where English law is less felt, to appropriate pieces of the forest to their own use; here they cut down the trees without reserve, and sow their crop of korrakan, rice, or vegetables. This is all the undressed soil will yield; and the next season another piece is similarly taken, while the deserted portion produces chena-jungle. In two years' time it is five feet high, and has become so thick and thorny that it resembles a great mass of buckthorn hedge, with the spines many times more sharp and long and hooked. Old jungle is often 15 feet and 20 feet high, and quite impregnable, save to the wild animals, whose favourite haunt it is. Reasoning by analogy, the most probable history of the immense extent of jungle-ground in Ceylon is that suggested by Mr. F. S. Baker, who concludes it to be the cultivated ground of the former numerous population, returned again to a state of nature.

The jungle sometimes consists of bamboos, which grow up quite close together, raising their delicate, feathery leaves aloft with excellent effect. Many useful plants abound in the jungle, where it is somewhat more open, such as nux-vomica, ipecacuanha, and the gamboge-tree. Wild cinnamon-trees are common everywhere, even as high as Nuwera Ellia. Occasionally groups of plantains diversify

the scene, and the cocoa-nut palm is sometimes unexpectedly encountered. The latter is always mournful in this association. It is the last vestige of man's abode, and the sign that depopulation is still proceeding. A family, or perhaps a small village, in the jungle, is decimated by fever or dysentery, and the working hands that are left are insufficient to keep off the increasing approaches of the rank vegetation. Thus the circulation of pure air is more and more checked. The deer or the wild boar ravages their small fields. They drop one by one, but still rapidly, and soon hunger and disease have done their work, and only a few cocoa-palms remain, to be destroyed by the elephants for the sake of the nuts.

Mahawelle River.—The high centre and abundant rains of Ceylon originate a great number of streams; but owing to the periodical character of the climate, these are for the most part rushing mountain-torrents at one season and dry beds at the other. Hence there are but few navigable rivers. The Mahawelle Ganga is the principal one. It rises on the south side of the mountains, close to their summit, and, running northward, enters the Indian Ocean near Trincomalie. About 40 miles from its mouth it throws off the Vergel-aar to the eastward, one of the most turbulent of the many torrents upon that coast. A tradition states it to have been originally a watercourse contrived for irrigation, which, during an inundation, became the outlet for the main body of the waters of the river. The importance attached to improving the navigation of the Mahawelle has suggested the possibility of again damming up its entrance. At present, wood and even canoes are caught in the current of its rapid stream, hurried out to sea, and often lost. And it is said that the gain on this account alone would, in a short time, more than repay the expense. The main river is about 120 yards wide, and from four to seven feet deep; but in flood-time it contains as much as 25 feet and 30 feet of water. The chief obstructions to navigation appear to occur about its lower course; and if these could be removed, as seems probable, the river would be navigable for 120 miles, or beyond Bintenne, and the trade of the north-eastern division would be greatly

increased. Satin-wood, ebony, and other timber-trees grow in exhaustless profusion along its banks; and the neighbouring grounds might again become what they formerly were—"the granary of Ceylon."

Lakes are very rare in this island, if we except the artificial tanks, which are frequently of large size. But upon the coasts a kind of lake, or lagoon, is formed at the mouths of many of the rivers. The monsoon currents throw up banks of coral and sand, which, blocking up the outlets, force the streams to turn right or left, often for miles, before they find a passage into the sea. Being thus checked, the waters have a tendency to spread themselves out upon the flat shore and form lagoons, or "gobbs," as the natives term them. These gobbs are more frequent on the eastern shores, owing to the larger quantity of detritus brought by the north-east monsoon. In this way most of the harbours of the country are formed, as Chilaw, Negombo, and Batticaloa. Swampy marshes abound near the last-named place, though they might, by draining, be converted into prolific rice-fields; then, for miles from the sea, sandy plains predominate, only partly cultivated for want of water in the dry season; but the eastern verge of the land is clothed with magnificent plantations of cocoa-palms, which extend for 30 miles both north and south of the port. These fine groves are of interest, as being amongst the latest results achieved by English energy.

As we advance up the coast a great change from this flat shore is observable, and at Venloos Bay is one of the many charming scenes in the north-east. The sea is overhung by gentle acclivities, wooded to their summits, and in an opening between two of these the River Natoor flows through a cluster of little islands covered with mangroves and acacias. A bar of rocks projects across its mouth at a short distance from the shore, and is frequented all day long by pelicans, who, going out at sunrise to fish, at evening return to their solitary breeding-places on the land. The strand is literally composed of shells in endless variety, whence are obtained the valuable Argus Cowries (*Cypræa Argus*), a pair of which have realized

as much as four guineas. The remnant of the coast Veddahs are settled here under the protection of the English Government.

Trincomalie.—Yet further north, the harbour of Trincomalie presents a scene of singular beauty. Completely landlocked, it is calm as a lake. Its broad expanse of waters and numerous beautiful islands, its rocky headlands and wooded slopes in the foreground, and towering mountains in the distance, form a combination which made Sir E. Tennent call it an Oriental Windermere. It has been often asked why Trincomalie is not made the capital, and it will be well to state briefly the merits of the question. Colombo cannot bear comparison with it. Instead of an open roadstead this is one of the finest harbours in the world. It is, moreover, the only one formed by nature which Ceylon possesses besides Galle. At Colombo, except close to the sea-board, is unproductive clay—the red soil called laterite, resulting from decomposed gneiss, which so tinges everything that the men of that coast are known by the colour of their clothes. At Trincomalie, except on the shore, is a rich soil with numerous rivers and exhaustless forests. To these facts may be added the circumstance that, while on the west the land is poor, probably from long cultivation, and locked up in small holdings, on the east it has enjoyed a rest for ages, and is all in the hands of Government to apply to the public benefit in any extensive enterprise. The sole reason which led the Dutch to select Colombo was doubtless its nearness to the cinnamon gardens, whose possession was their great object in settling on the island. Again, when Trincomalie is contrasted with Galle, it is equally to the advantage of the former. The roadstead of Galle is so exposed during certain winds that vessels have been blown out to sea, or forced to leave their anchorage and sail out; the harbour is encumbered with rocks, which the accidents that have occurred to the best-appointed ships show are not always to be avoided, although the entrance is never attempted after sunset. Neither of these objections can be offered against the harbour of Trincomalie. In the opinion of Sir H. G. Ward, writing in 1856, if steam communication

were reopened with Australia, or a double line from Suez introduced, it was physically impossible that the roadstead of Galle could long suffice for the increasing demands which would be made upon it; nor would the companies risk their magnificent vessels much longer in such an insecure anchorage. Then the capabilities of the northern port would be appreciated. Trincomalie can be entered with equal ease under the south-west or north-east monsoon; and vessels can discharge upon the beach without the aid of boats. If the road to Kandy be in proper order, the mails might arrive in Colombo as soon as they do at present from Galle, where twelve hours are often lost by the steamers in landing the bags. Also, it should not be forgotten that Trincomalie is already a rendezvous and dockyard for the royal navy, on account of its commanding geographical position; and the same advantage makes it a harbour of refuge for all vessels lying in the Madras roads as soon as the north-east monsoon threatens to commence.

Jaffna.—The northern and most extensive portion of the low country is variously constituted. Adjoining the hills it is much diversified, and is especially the "tank district." Further north, the whole island is composed of coral rock, becoming less elevated and more monotonous as we proceed. The peninsula on which Jaffna is built, and all the adjacent country, is one uniform level, with not a hill, and scarcely an undulation of a few feet. Everything is coral. The roads are formed of it; the Dutch fortifications of Jaffna are built of it. It is mostly covered with sand, reddened by iron, which seems to have been brought by the currents from India and blown inland. The soil produced is good,—light but fertile,—and is carefully cultivated by the industrious Tamil population from the continent. The flatness of the surface is against the construction of irrigation-works, and the district is therefore not well calculated for rice-growing. But the shore line is continually cut up by shallow lagoons which wind about in such an erratic manner that the land is almost an archipelago. These inlets have so little depth that a boat will hardly float in them, and the main road from the south crosses one of them at a ford. They,

however, supply the wells of these parts with never failing springs, by percolation through the coral rock, in the course of which the sea-water is deprived of its salt. In consequence, all the wells are below the level of the ocean, and some are said to show a sensibility to the action of the tides; but the whole subject of the occurrence of fresh water in coral rocks and islands, is a difficult one, and the *modus operandi* not yet satisfactorily explained.

Industry.—Hitherto we have been engaged in the consideration of the more important features of the physical geography of Ceylon. In passing on, now, to an examination of its productive industry, it will be convenient to maintain the same arrangement as before; but inasmuch as the occupations of the people seem to be most dependent upon the form of the land in the lowest division, and it is very desirable to mark this dependence wherever possible, we shall commence our remarks under this head with reference to the outer part of the island, and proceed inwards.

Palmyra Palm.—The most frequently-noticed feature in the district just described is the Palmyra palm (*Borassus flabelliformis*). Opinions differ as to its beauty, but it is here seen to great advantage. It occurs in topes and groves extending over square miles continuously, upon the islands and mainland alike. Within an area of 700 square miles, it is estimated there are 7,000,000 trees, whose valuable fruits supply one-fourth of the food of the 220,000 persons who crowd these broken lands. It is, in truth, that essential to the north, which the cocoanut palm is to the south of the island. Its appearance is sufficiently striking. Its perfectly straight stem rises to a height of 70 feet and 80 feet. Its broad fan-shaped leaves are elegantly arranged around it. Beneath the crown hang the large clusters of fruit, like bunches of ostrich's eggs, of a rich brown colour, merging into golden yellow at the base. It requires from 15 to 30 years to arrive at full bearing; but to extreme old age it retains its leaves all the way up its stem, and their tangled masses are the home of numerous ichneumons, squirrels, monkeys, and

various birds which live upon its fruit. Its flower-spathes supply the materials for the manufacture of sugar. They appear in November and December, when they are bound up tightly, the buds within being crushed. In eight days' time the sap begins to flow, and continues to do so for three or four months, at the rate of three quarts per day. This is caught in a chatty, and carried away every morning to the boiling-house, where it is partly crystallized into a half-solid syrup called jaggery. It is estimated that three quarts of sap make 1 lb. of syrup. In this state it is used on the spot. But upwards of 10,000 cwts. per annum are exported to India, at a cost of about ¼*d.* per lb. The jaggery is there further crystallized into sugar; and some of the latter is occasionally sent to Europe from Madras. The wood of the Palmyra palm is highly esteemed for its durability and resistance to the attacks of white ants. The Tamils have an expressive proverb, which says of the Palmyra, "It lives for a lac of years after planting, and lasts for a lac of years when felled." The annual exportation to India, in the form of laths, rafters, &c., consumes 7000 trees every year. Its leaves, moreover, are formed into "mats, baskets, caps, fans, umbrellas, books, and roofs for houses;" and that no part may be useless, its nut produces a fine oil. Thus has nature provided, in a single tree, for all the wants of man.

The staple article of cultivation in this northern province is tobacco. The moderate rains and high temperature,—from 70° to 90° in the shade,—are especially favourable to its growth; and the fertile soil, when skilfully tilled, yields it of excellent quality. The exports to India rose in value from 2600*l.* in 1836, to 55,000*l.* in 1854. It is chiefly sent to Travancore, where the Government, who have a monopoly in the article, are obliged to add a portion of Jaffna tobacco, in order to secure the sale of the inferior sorts collected from other parts. The energy of the people, as evinced in this cultivation, in the improvement of their indifferent ports (Point Pedro and Valvetytorre), and in other measures, is greatly praised by the late Governor, who also speaks most highly of the recently-made plantations of cocoa-nut

palms. It is pleasing to find him also remarking the grateful sense, expressed by all classes, of the benefits they enjoy under British rule.

Salt.—Large quantities of salt are supplied by the shallow inlets before spoken of; but the most important salt-works are at Putlam, whence Colombo is supplied with this necessary article. The manufacture of salt, both here and in India, is of interest, mainly on account of its being a Government monopoly, from which a considerable revenue is derived. The "lake" of Putlam is divided from the sea by a narrow peninsula, ending in the headland of Calpentyn. Upon this are the numerous ponds, of slight depth, wherein the salt water is evaporated by solar heat. The principal canal in the island is connected with these salt-pans, and the trade due to their production. It extends from Putlam southwards, passing Negombo and Colombo, to Caltura. And as the latter town is united, by the navigable Kellooganga, with the district of Saffragam to the south of the mountains, there is thus a water communication of 163 miles in length. In Saffragam, the natives have considerable plantations of coffee, the produce of which is in this way conveyed to the capital; while the northern part of the canal, primarily reopened in 1856, to meet the necessities of the salt trade, will conduce very greatly to the industrial progress of all the country around Putlam, and the ruined Anaradhapoora. This is a district containing not less than 60,000 industrious inhabitants, with which the coasting trade is suspended for many months during the south-west monsoon.

Salt is also largely made in the vicinity of a small but convenient harbour on the south-coast, named Hambantotte. The aspect of the adjacent country presents those strong contrasts only to be found in tropical regions. Broad plains of white sand stretch on either side, diversified solely by miserable patches of scanty herbage. The salt lakes are encircled by scrubby bushes, and knots of saline plants, and the whole is bounded by the unfailing jungle. Yet where the River Yalle passes through to the sea, rich strips of land occur, some of them highly culti-

vated; and dense groves of immense trees skirt the banks, inhabited by elephants and deer, and haunted by wolves and alligators. The salt-pools here are about half-a-mile from the sea, from which they are separated by sand-banks. They are six in number, and the largest is four miles in circumference. But the salt is collected in a most inartificial manner, by scraping it from the bottom of the shallows as the water gradually evaporates during the dry season.

Cocoa-nut Fibre and Oil.—The predominance of the cocoa-nut palm in the south-west has been more than once alluded to. It is there the staple production of the island, supplying meat and drink to the people, their clothing, also, and materials for their habitations; and at the same time furnishing several very valuable articles of export to this country. For more than 100 miles south-east from Colombo, the shore is margined with groves and plantations of this useful palm; they extend two and three miles inland, and are either edged along the sea-bank by a fringe of mangroves, or, as frequently happens, the cocoa-palms themselves stand on the very limit of the tide, and suffer their roots to be laved by its waters, while the pinnated foliage luxuriates in the saline atmosphere. So great is the love of this tree for salt that, on the coast of Brazil, the nut is always planted upon a bag of salt for the purpose of bringing the seedling more quickly to maturity; and in the rare instances where it thrives in positions distant from the coast, there is reason to suspect a copious supply of salt in the soil. In the part of Ceylon under consideration the cultivation of the cocoa-nut has existed from time immemorial. The abundance of food and raw materials of industry has produced a dense population; and the traveller from Galle to Colombo, along the high road, drives through a succession of thriving and well-peopled villages enclosed and united by almost uninterrupted forests of palms throughout the whole distance. In former times this was the principal seat of the cultivation; but owing to the important commodities afforded by the cocoa-palm for the European trade, extensive planta-

tions have been made, within the last 20 years, both at Jaffna and Batticaloa, and also on the north-western coast. Of those at the two places just named, Sir H. G. Ward speaks in terms of high commendation. He reports that 4000 acres are planted at Batticaloa, and not less than 10,000 acres in the neighbourhood of Jaffna. From both localities large numbers of nuts are either exported direct or sent to Colombo. As some guide to the cost of cultivation, the following statements have been compiled from good authorities. At Batticaloa, the clearing and planting costs 5*l.* an acre. This includes the expense of sinking numerous wells, from five to eight feet deep: for during the first year, the young plants require watering every day. It is not till the eleventh year that the trees are in full bearing, although they produce fruit four or five years earlier; and what with the cost of dressing the ground and other expenses, upwards of 20*l.* per acre will be expended before much in the way of return can be looked for. But when once the plantation is fully productive, the cost of its up-keep is comparatively small. The tree bears twelve crops a year, the nuts often amounting to 120 and 150 in number, and the total produce weighing a ton. Even when, according to the native practice, one crop is destroyed in the flower-bud, for the sake of the spirit, or the sugar, obtained from the sap, the return is still very large. These nuts, on the eastern coast, are worth 3*l.* and 4*l.* per 1000. On the opposite and more exhausted side they sell for 2*l.*, and moreover the trees do not bear above 60 at each crop. This difference is partly due to inferior cultivation, especially to the want of manure in the case of the older plantations, and partly to the excellent conditions of a pervious sandy soil, with abundant moisture from timely rains, and from the "gobb" on the one hand, and the sea on the other, which characterise the Batticaloa district.

The general appearance of a cocoa-nut as seen in England is well known. But, external to the hard shell which we are accustomed to see outside, there is a fibrous husk, two inches thick, some of which is always left adhering to the shell. This husk produces the cocoa-fibre

of commerce. The other useful portion is that which in England is eaten: and from it the oil is obtained. But every part of the tree is valuable to the native, and writers and poets celebrate the hundred uses to which it can be applied; its root and stem, its leaves, buds, and flowers, its husk and shell, nut and sap, are all made to minister to the wants or the luxuries of man. If the husk of a cocoa-nut be examined, it will be seen to consist of a great number of woody fibres, very irregularly bent and crooked, but tolerably equal in size. These are held together by a starchy substance roughly resembling pith or powdery cork. The husks are torn off from the nuts, and heaped together in vats filled with water, when the heat of the climate soon causes an incipient fermentation, which destroys the cohesion of the pithy matter. The husks are then taken out and beaten with a wooden club, causing the fibres to separate from each other; and when washed free from the half-putrescent starch, they are the coir, or cocoa-nut fibre of the markets. The uses of the material thus simply prepared are so numerous, that it has become one of our most valuable fibres. To fit the nut for long voyages by sea, the husk is adapted by nature to bear without injury both immersion in water and alternations of wet and drought, which are still more trying. This property of the fibre renders it admirably suited for the manufacture of mats and brushes, in which it is largely consumed. It also possesses great strength; and although its somewhat unpliable nature prevents its being spun into handsome-looking ropes or small cordage, yet it is made into excellent cables, which are at once strong, light, elastic, and very durable. Coir is also extensively employed in the manufacture of mattresses and similar articles for which its cleanliness and open masses render it well adapted. As an instance of the new uses continually being discovered for this valuable material, we may mention its recent introduction into cotton-spinning machinery, in which it now composes the teeth of a species of comb, so placed as to detach the loose fibres from the yarn in the finishing process. Very large and increasing quantities of coir are

brought into Great Britain. In 1860, Ceylon exported "coir rope and yarn" to the amount of 40,220 cwt., valued at 27,400*l.* It is sold in England at from 25*l.* to 50*l.* per ton.

The manufacture of cocoa-nut oil is somewhat more artificial than the preparation of the fibre. The white albuminous part is extracted from the nuts, cut up, and dried in the sun, when it is called "cópperah." This is then pressed by powerful rollers, steam-power being used on the best-managed plantations. The results are the oil and the "poonac," or refuse, on which are fed the large herds of swine always kept upon a cocoa-palm estate. At the usual temperature of Ceylon the expressed oil remains liquid, and is poured into casks; but it hardens to the consistence of lard at 72° Fah., and always reaches us in this condition. In England it is again subject to great pressure, from which also two results are obtained, namely, a beautiful limpid oil, suitable for burning and lubricating purposes, and a fatty residuum, or stearine, which is employed in the composition of candles. The oil in its imported state is, besides, extensively used by the soap manufacturers, on account of its cheapness and superior "body," or amount of fatty substance readily solidifying. It is estimated that 1000 good nuts will produce 525lbs. of dried copperah, and from this will be yielded 25 gallons of oil. The quantity exported in 1860 amounted to 129,700 cwts., the value of which was 161,400*l.*, but its worth in the English markets is from 40*s.* to 45*s.* per cwt.

Cinnamon.—The classical product of Ceylon is the choice spice, cinnamon (*Cinnamomum zeylanicum*). And so peculiar are the conditions required for the elaboration of its fine flavour that the growth of the best sorts is restricted to the neighbourhood of Colombo. Here the slight elevation of the ground, and the nearness of the ocean, cause an equable climate of great heat, the thermometer seldom ranging far from 80° Fah.; while the soil of the famous "Cinnamon Gardens" is almost pure white quartz gravel, with a slight admixture of vegetable mould.

Such are the requisites for the growth of the choicest

varieties, which the Singhalese distinguish as *Rase Corundu*, or "sweet cinnamon." The trees when cultivated are always kept in the form of bushes about seven feet high; they are planted three feet apart, and gamboge trees are interspersed for shade. The shoots are allowed to reach the size of a man's finger, which takes place every third or fourth year, when they are cut down near the ground, and divided into small pieces six inches in length. The cinnamon peeler then strips off the bark by a dexterous slit on each side of the stem, and after a couple of days the epidermis is sufficiently dried to be scraped off by a blunt knife. The remaining inner bark constitutes the cinnamon of commerce. The pieces are packed within each other, and curl up while drying into the form in which we see them. The value of this spice led to many attempts at extending its cultivation, especially at Batticaloa and Chilaw. It was also tried in the interior of the island, and at Bombay. But even plants of the genuine variety lost their superior flavour on these marshy and marly soils, although they commenced growing luxuriantly. Also, after the first peeling, it was found to be six or seven years before the shoots were again ready to be cut, and the quantity of bark became less instead of greater, as is the case upon the siliceous soils near Colombo. Hence the difficulty of supplying the increasing demands of the trade, which has been indirectly the cause of its falling off, as it has done of late years to a very considerable extent. It was discovered that another and cheaper article named cassia lignea (*Cinnamomum cassia*) might be successfully substituted for the genuine spice; and as this can be procured in great abundance, especially from China and Singapore, the trade in it has so much increased that the demand for the true cinnamon has suffered in consequence. The cassia-wood is the bark of a larger branch than that of cinnamon, and is by Mr. Baker said to be obtained in Ceylon from older and larger portions of the cinnamon-tree. A specimen before us (probably from China) has formed part of a stem at least six inches in diameter; it is nearly a quarter of an inch thick, of lighter colour and much coarser appearance

than the true spice, and (although the contrary has been asserted) it is certainly more pungent and less delicate in flavour.* The average quantity exported from Ceylon for the years 1850-60 was about 600,000 lbs. per annum, all but a very small portion of which was sent to Great Britain. It does not appear likely that the amount will increase, and the utmost that can be expected is that its production will not completely cease under the competition with the cheaper produce of the *C. cassia.*

Rice, Tanks.—It has been said that much, even of the lower section of the island, consists of hilly ground. These undulations are especially conducive to the cultivation of rice, since they afford the means of irrigation so essential to its growth. The ingenuity of the inhabitants is never better displayed than in the way they avail themselves of every advantage of ground for this purpose. A re-entering valley between two hill-spurs is a favourite locality. They lead a mountain stream, perhaps from a distance of many miles, to the junction of the ridges at the head of the vale, and afterwards along their crests on either side. Their sloping flanks are then scarped into steps, a low ledge of earth or stone being left at the outer side of each terrace to contain the water which is supplied from the canal above. This water is allowed to fall from step to step until it irrigates the whole valley, from the top of the hills to the bottom. Even when the precious stream has been thus made to fertilize the slopes of one valley, it is taken charge of by the inhabitants of another, and made to do duty again and again in the country lower down. Another method is to select a spot near the outer ranges, where the extremities of two spurs approach each other, and permit a river to pass between them. A "bund," or bank, is then built across from hill to hill, which, acting like a dam, stops the stream in its course, and causes a reservoir above it. These are the tanks for which

* Besides the bark, the leaves of the cinnamon-tree yield an essential oil called oil of cloves, and excellent camphor is procured from its root. The natives use the flowers as a spice, and compound the pulp of the berries into delicious cakes.—'Technologist,' Dec., 1860.

Ceylon is so justly celebrated, but their formation belongs to days gone by, when the island was densely peopled, and its kings powerful princes; and only their neglected and overgrown, but still wonderfully perfect, remains exist to attest the magnificent designs of their contrivers, and the skill of the ancient engineers.

In the official reports upon the "Past and Present Condition of Her Majesty's Colonies for 1856" will be found the most carefully-prepared accounts we have of the present state of these works.* These papers were drawn up with a view to ascertain the practicability of reopening some of those great sources of ancient prosperity; and the extreme interest of the "tank question" requires that some notice should be taken of it here, although it is difficult for us fully to realize its importance to a country like Ceylon, where a perennial supply of water is absolutely synonymous with food, and even with life itself.

On the north-eastern side of the island, 21 miles from Trincomalie, is the great tank of Kandelly, whose waters now run to waste into the sea. Scattered along a line of 60 miles to the south-west of Kandelly are as many as eight other tanks, some of them more than rivalling it in dimensions. Even in its present state the Kandelly tank covers an area of 15 square miles in the rainy season, and one of never less than three in the driest. It is surrounded by gentle hills covered with wood, and a slope of grass extends from the water's edge to the forest. Its bund is of the most durable construction. It is one mile and a quarter in length, and 50 feet high, while its breadth at the base is 120 feet, and sometimes 150 feet. On the inside it is faced with huge stones, to resist the action of the water; jungle and large trees on the outer side concealing its artificial character. All these lakes but one are also united by a canal, estimated at 100 miles in length, and which served both to convey the water from one to the other, and also, as it would seem, admitted of being navigated; for in one spot its explorers found a gigantic tamarind-tree growing on the top of the embankment, to which tradition says the boats were fastened on their

* See also 'Journ. of Geographical Soc.' Vol. xxvii.

stoppage at this place, and the natives point to certain scars near its root, which they say are the marks of the chains and ropes. The whole series of tanks, together with this canal, is supposed to be the "Prakrama Sea," which the historians of Ceylon tell us was formed by Prakrama Bahoo I., a famous sovereign crowned at Pollanarua, A.D. 1153. To uphold the waters of this sea embankments of the most extensive kind were required, and one of these has been traced for 24 miles, having a height varying from 40 feet to 90 feet.

Besides this extraordinary chain of tanks there existed, about 40 miles to the north, that of Padiwel Colum, the most gigantic work of all, whose bund, still in perfect repair, except at the one passage forced by the waters, "was 11 miles long, 30 feet broad at the summit, 180 feet at the base, and 70 feet high." Two other tanks of enormous size for the supply of the former capital also exist to the westward of this. Padiwel Colum is now a park covered with lofty trees, so long is it since it became ruinous. It is recorded to have been completed by Maha Sen, A.D. 66, and "its construction must have occupied a million of people for ten or fifteen years." Such are some of the statements made respecting this wonderful system of irrigation, which supported a population probably ten times as numerous as the present. Enormous sluices were formed in the bunds at different levels, for regulating the supply of the water; most of which are still in being, and some actually performing their work as of old. Other great stone erections were made to serve as spill-waters in times of superabundant rains. One is not surprised at the deep desire which an active Governor would have to render some of these works again productive, as he passed on from tank to tank and saw the streams of priceless water issuing from the broken bunds, and beheld the broad plains below, once fertile paddy fields; and we can sympathize with him in his sadness as he rode on for five days (to use his own words) through the most lovely country in the world, through tracts the richest in all Ceylon for rice and cotton, and came upon the ruins of village after

village, now so desolate that not a human being was met with, and herons and bitterns sat like statues on their accustomed perches, as the cavalcade passed by, without any fear of man. The very magnitude of the work appears to forbid its commencement. It would take a large number of men to repair all the tanks; and if labourers could be collected, the difficulty would be very great of finding water for them during the dry season, when alone they could work. Captain Simms, the commanding officer of the Royal Engineers in Ceylon, has consequently suggested the experiment of restoring Kandelly by itself. It is within easy reach of Trincomalie, which would also afford a ready market for the increased supplies; and an orderly native population exists to whom the land thus benefited might be leased on advantageous terms. This plan promises so much at a comparatively small cost, that a few years at the farthest will probably see it carried out. It is a most anomalous state of things that obliges Ceylon to import rice to the value of half a million sterling, without then averting the danger of being half starved, while it possesses such ample means of increasing its own production of grain; and that, through the neglect of works already constructed, suffers extensive tracts to lie waste, whose very names are a protest against famine; as for example, the district in the western province called Wellasse, that is, a hundred thousand rice-fields.

Want of space compels us here to leave this lowermost section of the island, although we would willingly linger over its great capabilities whenever the permanent population of Ceylon shall have become more numerous. Its industry is shown to be varied and extensive even now, and it is rapidly rising in importance. The commercial articles it yields are of almost universal demand, and its Palmyra and cocoa plantations, its spice and tobacco gardens, its nux-vomica and castor-oil plants on every rubbish heap, and its extensive paddy fields, will assuredly receive attention, and develop their products in manifold proportion, now that English planters and merchants are firmly settled in the country.

Coffee.—The principal branch of industry connected with the hill-region which will engage our attention is the cultivation of coffee. Indeed, so marvellously has the production of this berry increased in recent times that it may be considered the staple of the island, and possibly very many of our countrymen only know Ceylon as a place where coffee is grown. It must not be supposed, however, that the useful vegetation of this division is confined to one plant. To take an instance presented by Sir E. Tennent—the Oovah district on the east is admirably suited for pasturage, and buffaloes are maintained in large herds. Much cultivation is likewise carried on. Here the natives grew coffee long before any European made the attempt. Here excellent irrigation works occur, together with their dependent rice-fields. Here also are grown, very extensively, all kinds of curry-making materials,—turmeric, capsicums, onions, garlic, cardamoms, pepper, and the like. The lemon-grass has been already mentioned, and valuable dyes are produced for native use, as indigo, madder, sapán and arnotto. Again, of Maturatte, between Kandy and Newera Ellia, Sir H. G. Ward relates, that "the valley, extended by artificial terraces up every ravine, down which water can be made to pass on its way to the river below, presents a vast expanse of green, reaching to the very crest of the surrounding hills, while where paddy cultivation ceases, coffee cultivation begins; and in the immediate vicinity of the villages there are gardens in which onions and potatoes grow luxuriantly."

Nevertheless, the coffee-plantations give the character to the cultivated parts of the country. They always present a beautiful appearance, but especially so just before the harvest. The elements of this beauty are, first, the thick leaves, dark and glossy, like those of the laurel in shape, and massing elegantly; next, the ephemeral flowers, of the purest white, resembling those of the jasmine both in form and perfume, collecting in tufts at the tops of the young branches, blooming so suddenly that they produce the effect of snow fallen on the trees during the night; and, lastly, the bunches of crimson berries which

succeed them, in appearance like small, oval, stalkless cherries.

In the coffee district there is very little level ground. The hills are chosen for its cultivation, partly because of the lofty atmosphere which seems required for the most favourable growth of the fruit. The climate does not necessarily possess an excessively high temperature. The mean at Kandy is indeed 75·9° Fah., but the plantations are always several hundred and sometimes thousands of feet above that city. The air must have the purity which belongs to elevated situations; and not be too damp, or the plant will produce luxuriantly, it is true, but not berries of the finest flavour. Thus it is that in Jamaica, Ceylon, Mocha, and other coffee-growing parts of the world, the plantations clothe the flanks and crown the summits of the hills, while plants loving heat and moisture thrive in the plains and valleys below. In Ceylon, the hills are also chosen on account of their being more frequently covered with forest than other districts. Jungly ground is rejected because of its poverty, unless the growth of trees appears very old, in which case it approaches the forest in its effect upon the fertility of the soil. Neither are pátenas ever attempted by Europeans for a similar reason. This necessity of adopting the forest as the site of the future plantation greatly enhances the cost of preparation. The Ceylon woodmen employed in clearing the ground make an ingenious use of the entangled state of the forests, described in the former part of this chapter. Their practice is, to commence at the bottom of the hill, and saw all the larger trees halfway through on the upper side. When several acres have been thus treated, they select a group of the largest and topmost trees, and cut them completely through; these precipitate themselves in their descent upon those below, and they drag others after them by the living ropes which harness them all together, until the whole mass falls with a sudden crash, which, in the still atmosphere of the hills, is audible at a distance of two or three miles.*

* Sir E. Tennent.

After lying a few days the fallen wood is burnt, the largest timber being removed wherever practicable. The young coffee-trees are mostly obtained from cuttings, and are planted six or eight feet apart. The wet season is the proper time for this operation. The period before bearing depends upon the altitude of the stations. In Ceylon, at an elevation of 3000 feet, the first crop is produced in 2½ years, by which time the trees are four feet high. The old shoots require pruning out every year after this, and the trees are never allowed to rise above seven or eight feet. Much care is also needed in the treatment of the shrubs, and the soil must be yearly manured, and replaced where carried away from the steeper parts of the plantation. Also eddying winds of great violence occur, and loosen the tree, and injure its bark. Nor are these the only difficulties of the planter. Monkeys and squirrels feed upon the berries, and caterpillars eat the leaves. But the scourge of the coffee-plant, by whose ravages whole plantations have been destroyed, is a small bug (*Lecanium caffeæ*) which forms colonies of scaly nests upon, or rather in, the leaves; and increasing with astonishing rapidity in seasons more than usually damp, the trees attacked by it turn yellow, and lose their vigorous appearance; the blossoms and berries drop off, and in a few years the infested plant is dead. No remedy has hitherto been found for this pest, but a drier season than common stops and often destroys it.

The cherry-like fruit contains two seeds, which are the coffee of the shops. These are enclosed, first in a thin, dry skin which covers each separately, and then in the more fleshy outer envelope. When the berries assume their dark crimson colour, they are sufficiently ripe, and are plucked by hand, one labourer being expected to gather two bushels a day. They are then rasped upon large copper graters which tear the pulpy covering; and are afterwards thrown into a heap, where in a few hours a partial fermentation so loosens the integument that it separates by washing. The berries are then dried in the sun, and taken to Colombo. There they are passed between rollers which crack the parchment-like skin with-

out crushing the seeds; and, when the fragments have been removed by winnowing, the coffee is ready for the market.

The European cultivation of coffee in Ceylon is of comparatively recent date. The first English plantation was on an estate at Peradenia, near Kandy, belonging to the Governor, Sir Edward Barnes; and was made in 1825, upon the completion of his great road from Colombo to Kandy, which enabled us to call the interior of the island our own. Events favoured the extension of the trial. Up to that time, our principal supplies of coffee had been drawn from the West Indies, especially Jamaica. In that year, half the import duty was remitted, and the quantity which reached us rose from 7,993,000 lbs. in 1824, to 10,766,000 lbs. in 1825, and two years later to nearly 15 millions. This importation continued to increase till the emancipation of the slaves stopped the producing power of the West India Islands. Fortunately for Ceylon, the duties upon East and West Indian coffee were equalised in 1835, and a great impetus was then given to the cultivation. As often happens, the prospect of rapidly making a fortune drew many adventurers wholly wanting in the requisite knowledge. Many bought land on speculation; and by 1845, 290,000 acres had been sold for plantations, and the rage for land caused a ruinous rise in its price. Naturally, much of this injudicious dealing brought disaster on its promoters. The money difficulties of 1845 in Great Britain, nearly overthrew the coffee-planting interest in Ceylon. Also, by the removal of protective duties, the coffee of Java and Batavia competed on equal terms with British. And in the panic which followed these circumstances, land was sold with almost greater rashness than it had been purchased. Sir E. Tennent mentions two estates at Badulla, which cost 10,000*l.*, and were sold for 350*l.* Another, bought in 1843 for 15,000*l.*, sold in 1847 for only 40*l.*, and probably one-tenth of the estates returned to a state of nature again. In time, however, more prudent counsels prevailed, and the planters, though much less sanguine, became really more prosperous. With care and energy,

coffee-growing pays a fair, though not a large profit.* One great difficulty is to procure the requisite labour. The Singhalese and Kandyans make no objection to the work of first clearing the forest, but will not assist at any of the subsequent operations, which are therefore carried on by Malabars from India. From 80,000 to 90,000 of these coolies are thus employed. And until they become permanent inhabitants of Ceylon, the planters must always be subject to uncertainty on account of an immigration influenced by events in another and larger country. These men have, moreover, to be fed with rice, and paid in Indian silver coin, the value of both which commodities is entirely controlled on the continent. But, notwithstanding all obstacles, the growth of coffee is extending itself on every side. It was estimated in 1857 that the British estates comprised 63,771 acres in full bearing, and 17,179 acres more as young plantations. The average crop for the previous two years was 347,100 cwts. per annum, besides which the native crop produced about 160,000 cwts.† This statement, we may remark in passing, illustrates the meaning of the terms "Plantation" and "Native" applied to the two principal kinds of Ceylon coffee; and while English estates are yearly spreading, those of the natives are no less so. This large increase is set out in a very striking way by comparing the exports from the West Indies and Ceylon. Thus, in 1827, the former exported 29,419,000 lbs. and the latter only 1,792,000 lbs.; while in 1857 the quantities were 4,054,000 lbs. from the West Indies against 67,453,000 lbs. from Ceylon; so that while the total export was considerably more than doubled in the space of 30 years, that from Ceylon had increased itself upwards of thirty-seven times in the same period; and this island now supplies Great Britain with three pounds out of every four of the coffee imported. And yet there is room for an enlarged production. It is asserted, both that the average return may be trebled in extent, and also

* Mr. Baker, in 1854, estimated it at 20 per cent. on the capital. It is probably higher than this.

† Mr. Ferguson, quoted by Sir E. Tennent.

that by improved processes and modes of culture 25 per cent. may be added to the yield per acre; and then Ceylon (natives as well as planters included) may furnish us with two million cwts. per annum. At present the plantations chiefly exist on the line of road from Colombo to Kandy, on that from the latter city to Newera Ellia, and around Badulla, and to the south of it. The latter is the district which is principally occupied by the natives; but in 1857 the Governor reports, as a new phase in the cultivation, that it had greatly spread in the vicinity of Kandy, especially in the small holdings of the natives. It is impossible to dismiss this subject without remarking upon the extraordinary revolution which the cultivation of the coffee-berry is working in Ceylon. The introduction of a large number of industrious labourers is both setting a good example before the inhabitants of the island, and providing a large market for all the products of the low country; coincidently with which, the roads and irrigation works, judiciously undertaken or encouraged by Government, will, in time, enable the increased demand to be supplied without importation.

Minerals, &c.—Above 4000 feet the coffee plantations cease. We are then in the mountain region, the mineral riches of which may hereafter cause it to become the seat of industries as important as those now described. The iron ore of Newera Ellia is excellent, yielding 80 per cent. of the metal. Minerals of great variety and value exist in all parts of the island. Iron is generally dispersed; but especial notice should be taken of an extraordinary deposit of black iron-sand on the north-eastern coast, about 17 miles above Trincomalie, where it is washed out of the cliffs and triturated by the waves. Plumbago occurs in great purity at Ratnapoora and other places; and 3750 tons of this valuable mineral were exported in 1860, chiefly to Great Britain. Quicksilver was formerly worked near Colombo, and gold has been discovered in the plains of Newera Ellia. Ceylon was anciently famous for its precious stones; but, except pearls, these do not now figure in the exports. After lying untouched for 18 years, the pearl banks near Arippo were again fished

in 1855, when Government made a net profit of 10,000*l*. In 1857 they were tried again with even better success. The oysters were brought in, on the last occasion, at the rate of from one-and-a-half million to two millions per day, some boats collecting 33,000 at one fishing. The total number fished was 32,453,000, which will give some idea of the enormous production of the banks. The plan of proceeding is that the Government should take three-fourths and the boat one-fourth of the oysters brought up. They are all sold to native dealers (who combine to keep down the price, and are met by the Official Superintendent threatening to close the fishery), at prices varying from 1*l*. 10*s*. to 2*l*. 12*s*. per 1000. These men then take all the risk, and hence what the pearls ultimately sell for is not known. The remarkable fluctuation to which this fishery is subject is not yet satisfactorily traced to its cause.* But a period of success seems now to have commenced, and in 1862 it was estimated that the Old Cheval Paar Bank contained 96,000,000 of oysters. Chank-shells (*Voluta gravis*) are also collected in abundance, and sent to India in enormous quantities; and Cowries (*Cypræa moneta*) reach England by thousands of hundred-weights. The former are cut into bangles, or rings, worn by the Indian women on their arms and ankles; the latter are a small shell obtained principally from the Maldives, and used in West Africa as money. It might be expected that ivory should be an article of export, but very few of the Ceylon elephants bear tusks, although much ivory of an inferior kind might be obtained from their teeth.

Prospects.—With a hasty glance at the prospects of Ceylon we shall bring this account to an end. The Legislative Assembly, under the advice of a far-seeing Governor, are extending the benefits of British rule to every part of the island. The ruins of gigantic towns,—those of Anaradhapoora cover 256 square miles,—speak of a population many times more numerous than the 1,900,000 people returned at the census in 1861;† and

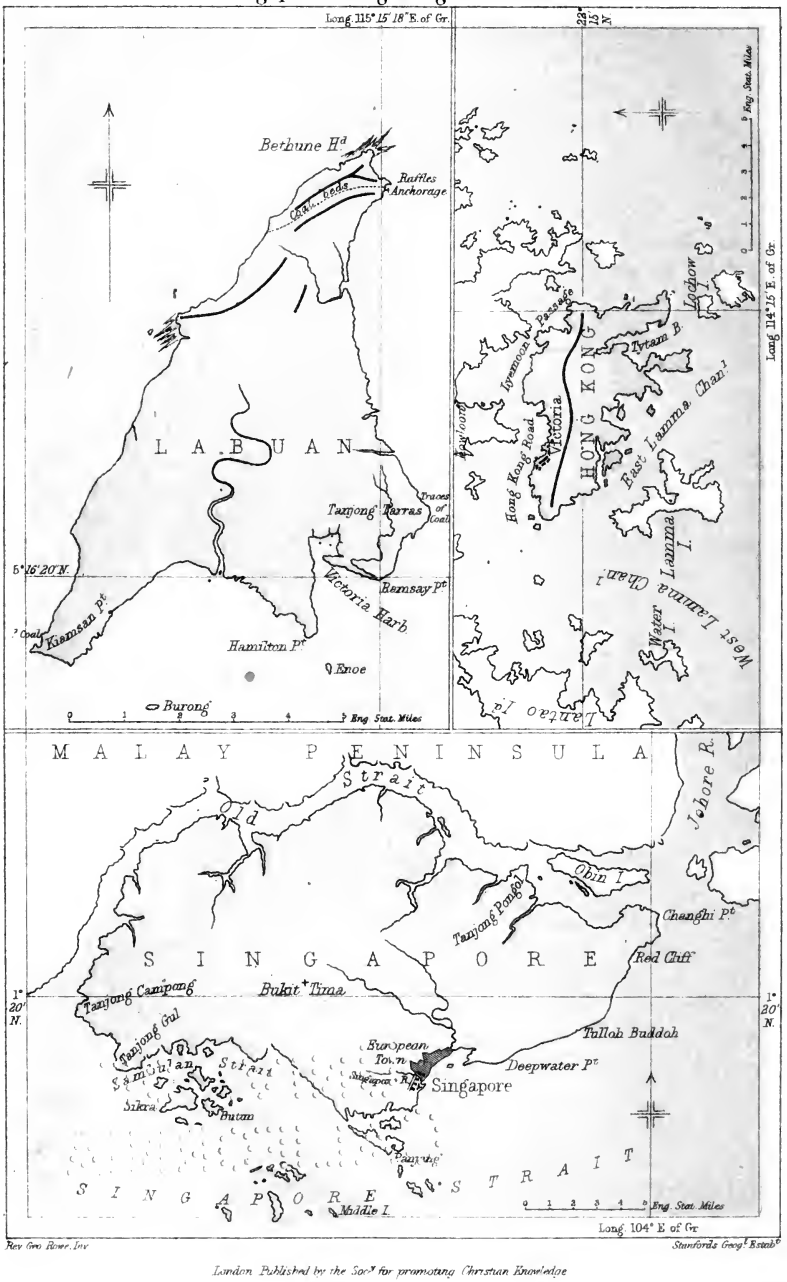
* Gov. Reports. See also Simmond's 'Lect. on Shells and their Uses.' 1856.

† The white population numbered 6692.

some portion of the large decrease thus disclosed may fairly be expected to vanish as the schemes now on foot become developed, and food is raised in greater abundance. "The hundred thousand paddy fields" of Wellasse may cease to be a myth, and the great tanks of the centre again fertilize their millions of acres. Scarcely a limit can be set to the growth of the palmyra and the cocoa-palm, and how vastly that of coffee may be extended we have already seen. In July, 1858, a railway from Colombo to Kandy was begun, and will afford cheap and easy carriage for the staple crop to the port of shipment; already, the telegraph line was then far advanced, which is to connect Galle with Madras, Bombay, and Calcutta, and make it the port of call for the whole Indian trade.* The valuable minerals of the island are all but unworked; and many animal productions will hereafter enter more largely into the exports: while on the eastern coast, between Batticaloa and Trincomalie are reported broad plains of 100 square miles in area, admirably suited for the growth of cotton. It may be permitted us also to hope that in developing the rich and varied resources of this valuable colony, the presence of the British race will at the same time elevate the native populations, both socially and also out of the degrading forms of religion in which they are at present sunk.

* Sir H. G. Ward. Report. 1858.

Singapore, Hong Kong and Labuan.



Rev.d Geo. Rowe. Inv.t

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CHAPTER VII.—HONG KONG, LÁBUAN, AND SINGAPORE.

Hong Kong.—Position; Formation; Harbours, Victoria; Kowloon; Importance.
Lábuan.—Situation; Outline; Harbours; Vegetation; Coal.
Singapore.—Physical features; Climate; Industry; Pepper; Trade. **Malacca. Pulo Penang.**

Hong Kong.

The island of Hong Kong is one of many which occupy the entrance of the arm of the sea leading to Canton. It is divided from the mainland, on the eastern side of the opening, by a narrow strait, which, by a promontory from the mainland, contracts in one part to a quarter of a mile in width. The island is about eight miles long, and has an area of 29 square miles.

A chain of granitic mountains running north-east and south-west fills, or rather forms, the island, which possesses very little level ground. Victoria Peak, the loftiest point, overlooks the ocean to the south-west, and is 1776 feet above it. A coarse grass conceals a scanty soil, and rocks often compose the surface. In the crevices, stunted oaks, rhododendrons and a few other shrubs are found, together with a great variety of beautiful ferns. Some of the lower valleys exhibit great luxuriance of vegetation; and, since the cutting down of trees by the Chinese has been stopped, and planting encouraged, the country will in time become less bare than it is.

Victoria.—Its prime value consists in its noble harbour, a few miles from its south-west extremity, and of which another promontory named Kowloon forms the northern or mainland side. This fine sheet of water is three miles across, and affords excellent anchorage for all classes of shipping. The city of Victoria spreads along its narrow shore, straggling up the more gentle hills, and is girt by an amphitheatre of mountains 1000

and 1500 feet high. Only a small Chinese village existed here when we took possession of the island, but the total population is now 95,000, of whom about 1500 are Europeans; and at Victoria alone there were 58,000 natives living in houses on shore in 1860, and not less than 28,500 in boats on the water. This increase of the Chinese inhabitants is at once a source of difficulty and of satisfaction to the British authorities. Of difficulty, because these people are aliens, ignorant, suspicious, capable of being turned into foes, at least to some extent, as in 1857, when the whole white community was in danger of being poisoned by arsenic mixed with their bread. They are also with great difficulty prevented from introducing and spreading disease by their filthy habits. And on the other hand, that a large native community should be attracted by our rule, containing many of the elements of wealth and good order, and that the Chinese should willingly place themselves under foreign laws in return for the superior justice and fair dealing secured to them, is a tribute of respect to our rule, of which we may well be proud. To such an extent has the population outgrown the available space of the island, that Kowloon has been attached to it, thereby destroying a notorious nest of pirates and thieves, and obtaining a healthy camping-ground for our troops. This small tract is also of granite, and composed of an infinite number of small rounded hills with fertile spots between them.

Hong Kong is said to be named in allusion to its abundant supplies of water; and during the year as much as 73 inches of rain are received,—chiefly while the south-west monsoon is blowing, from May to September. But the necessities of Victoria have so much increased that it has become requisite to bring water from the copious springs of Pokfullum, a village four miles off, near the Peak. This and other sanitary arrangements will, it is hoped, have the effect of so improving the health of the settlement, that the bad reputation it has acquired will by degrees wear out.*

* Idleness and drunkenness are affirmed to have principally created the great mortality amongst our troops.

Importance.—The settlement must be regarded as simply a secure position for our shipping and merchants in the vicinity of the southern markets of China. Its unproductiveness is such that it can never support an ordinarily numerous population. But its success has been very marked as a commercial port. Writing in 1858, Sir J. Bowring, then Governor, observes that shipping of more than 2000 tons burden entered the harbour every day; and declares Hong Kong to be the centre and controlling place, around which the vast commerce of the China seas was gathered. Flags of all nations frequent this free port; and it has of late years become the point of departure for the emigrants to Australia and California; as well as to the British colonies contracting for Chinese labourers. From 10,000 to 15,000 emigrate thus every year. It may be added that the value of the imports in 1859 was nearly 4,000,000*l.*, and half as much again in 1857; that of the exports being almost an equal amount.

Its great rival is the European port of Shanghae. This port, placed near the mouth of the Yang-tse-kiang, and therefore commanding the main artery of the Chinese Empire, must eventually eclipse Hong Kong. But the latter will always be the seat of a great trade with the south; and as a means of introducing a Chinese population to English law and education, and to the Christian faith, it must exercise a considerable influence in ameliorating the condition of the whole people.

LÁBUAN.

Lábuan is a small insular settlement on the north-west coast of Borneo, in east long. 115° 19′, and north lat. 5° 12′. It is about six miles from the mainland off the mouth of the River Brunè, up which is Borneo or Brunè, the capital of the neighbouring country, situated 20 miles from the sea. Lábuan is triangular in outline, with its apex to the north. Its sides are about 10 miles long, and its base not quite half as much. The western coast is dangerous to approach on account of the heavy surf, and the anchorage is not safe. But towards the south-east

corner of the island is a good harbour, with firm holding-ground in from six to seven fathoms of water, forming a refuge for shipping during the violence of the north-east monsoon. On the eastern side, near its north end, is a tolerably secure anchorage, important on account of its vicinity to the coal, for which the island is chiefly valued.

Vegetation.—The surface of Lábuan is varied by a number of small hills, never rising above 150 feet in height, and usually crowned with trees. Mangrove-swamps line the shores in some parts, and on the south side the small river China issues from a marsh. But a thick forest or a dense scrub covers the greater portion of the island, in which are many valuable trees,—dammar, teak, gutta-percha, and camphor-producing trees. A great variety of epiphytes cling to the branches, and numerous bright flowers feed countless swarms of bees.

On the eastern side of the harbour is a small grassy plain, on which the town of Victoria is built, and which is further interesting on account of a Malay tradition which affirms it to have been cleared at a former period by some British settlers. Only a small portion of the interior has been occupied, but enough has been learned to prove that the soil is richly fertile, and the country well watered by springs and brooks. The sugar-cane, rice, and the cocoa-nut-palm thrive admirably, and the latter has also been planted on some of the adjacent islets. But the clearing and draining of the settlement has hitherto been much retarded by the want of labour. The natives of the mainland were deterred from coming, partly through the jealousy of their chiefs, and partly because of the unhealthiness of the colony. And this insalubrity, from a cause becoming a consequence, was traceable to the cessation of the necessary drainage works. Convicts have occasionally been brought from Hong Kong, and when these have recovered from the voyage, and have been properly housed, fed, and employed, their bill of health is a complete contrast to the sickness which prevailed among the small Sepoy garrison, idle in the extreme, and spending their pay on bang and opium, instead of on wholesome

food.* No doubt the wet monsoon promotes fever in a jungle-covered country; but where the rank vegetation is only partially removed, there appears ground for the opinion of Governor Edwardes that the climate of Lábuan is as healthy as that of Singapore. The total population in 1860 was 2440, of whom only 33 were whites.

Coal.—Lábuan is best known in connection with its coal-mines. The coal-deposits have been traced across the northern end of the island, along a line running in a south-west direction. They are worked on the eastern side, where also the small town of Tanjong Kubong has arisen near the anchorage above mentioned. Vessels of moderate draught can approach close to the shore, and the coals supplied are reported to be equal to Newcastle coals, though burning rather faster. The company working these seams had to contend with serious difficulties arising from the want of labour, the choking of the galleries through land-slips caused by heavy rains, and other obstacles; but during the years 1851-4 they raised on an average 7000 tons per annum. This coal sells on the spot to H.M.'s vessels at 1*l.* a ton, but in China and Singapore it realizes from 3*l.* to 4*l.* Iron has also been discovered in abundance, and probably good pottery clay.

The trade of Lábuan consists in distributing the products of the island and the adjacent country to Singapore, China, and other places in the same seas. These are bees'-wax, camphor, hides, and the Chinese delicacies —birds'-nests and trepang. Cotton-goods and hardware are received from Singapore; and pepper, sago, and the greater part of the exports, from Borneo. The total value of the imports in 1860 was 37,842*l.*

Lábuan was ceded to us in 1846, in consequence of the piracies of the Sultan of Borneo, or Brunè. Its possession gives us the command of the neighbouring coast, either for the purposes of trade, or for the suppression of piracy: while its large stores of good coal, and its harbour of refuge, are invaluable to our numerous shipping engaged in those seas.

* Gov. Edwardes. Desp., 29th April, 1858.

Singapore.

The island of Singapore is situated at the extremity of the Malay Peninsula, and near the southern entrance to the Straits of Malacca. It has an irregular, oblong shape, narrowing towards the east, and is 27 miles long, with an average breadth of 11 miles. Its area is estimated at 275 square miles. The country is generally hilly, particularly in the northern part, where is the highest point, a hill named Bakit Timah, rising 530 feet above the sea. The town of Singapore is on the south-east side of the island, on the flat shores of a bay which forms an admirable roadstead. It is protected on the south-east by a narrow sand-spit, locally termed a "permatang," projecting towards the south-west. These permatangs occur at the mouth of every stream on this coast, and are formed under the influence of the north-eastern monsoon. They drive all the rivers westward by their encroachments, and the plain to the east of the River Singapore, on whose banks the city is built, bears evidence of this movement; for it is crossed by several low ridges, former permatangs, with broad, flat valleys between them. We are not informed whether this change is still progressing, or if it can be checked by artificial means, but it is a subject not without interest to the future of the settlement. The port is a scene of constant activity, from the number of vessels and boats of all sizes which frequent it. The town is very largely occupied by Chinese, whose quarter reproduces all the stereotyped forms, trades, and noises of their native country. Mr. Oliphant calculated that there were 70,000 Chinese settlers in 1857. A few thousands of Malays and scores of Europeans complete the population.

Climate.—Within 80 miles of the Equator, the climate is necessarily hot. The mean heat is 80° Fah., and the extremes never vary 10° from this average. The uniformity is assisted by the frequent cloudiness and deposition of moisture, which amounts to 100 inches of rain per annum. Thus the country is kept perpetually fresh and

green. A verdant lawn, skirted by a carriage-drive, runs round the bay, ending in the shade of a magnificent banian. Early in the year, the groves of nutmeg-trees arrest the visitor's attention by their pear-like fruit, opening and showing the crimson mace around the seed. And the handsome bungalows of the English and German residents stand upon the encircling hills, each enclosed in its garden of tropical plants and fruits.

Industry.—Forests cover the more uneven parts of the island, and still supply the substance called gambir. This is a powerful tanning material obtained by boiling the leaves and twigs of *Uncaria gambir*, a tree allied to those producing coffee and quinine. In the vicinity of the town, only a few very lofty trees have been left standing here and there; and the ground is occupied for miles together by plantations of pine-apples. The plants are often as tall as a man, and the fruit is deservedly praised for its excellence. The sugar-cane is also cultivated to some extent, but the staple industry is the production of pepper. Pepper-gardens have also been largely planted on the mainland of Johore, where, like those on the island, they are tended by Chinese. A singular cause affects this generally profitable occupation, namely, the prevalence of tigers. For a long time, the narrow strait on the north, though only a quarter of a mile wide, kept them out of Singapore, but as Chinamen increased, the temptation became too great, and having learned how to cross the water about the year 1834, they have since devoured many hundreds of the people. They make their attack in the day-time, and are only scared by numbers of their intended victims. The moral effect upon rogues and thieves, who thus lost their refuge in the woods, is described as being so great that a Rajah of Celebes seriously proposed to introduce tigers into his dominions as a measure of police.* In Johore they were so numerous in 1857, just at the time of the pepper-harvest, that 50 Chinamen were carried off in three weeks, and 15,000*l.* worth of the fruit were left on the trees in consequence of the pickers deserting their work through fear.†

* Pickering: 'Races of Mankind.' 1841. † Oliphant.

Trade.—Singapore owes its rise and present importance to the change of route which now brings all vessels passing through "the Straits" almost within hail of the town. It is admirably fitted by position to be the emporium of the Eastern archipelago and the rich countries adjoining; and the place of exchange for the commodities and productions of the nations far to the east and west. The regularity of the monsoons favours the voyage of the unwieldy native junks to and from this central spot. And, accordingly, here are collected the tin of Banca and the peninsula, the antimony and gold of Borneo, the gambir, caoutchouc, and gum-benzoine of the neighbouring islands, even the least of which sends its quota of pepper and rice. Dye-woods and gums, and the molluscous dainties of the Chinese, also find a market. While in exchange against some of these goods are brought the manufactures of Great Britain, and the rich embroideries and inlaid weapons of India. Where the consumption of a country is small, as in this instance, the values of the exports and imports are nearly the same. In 1850, the former were returned at 2,500,000*l.*, but have greatly increased since that time, as the imports of India alone amounted to a million sterling, on the average of the years 1857-60.

Malacca.—Within the Straits, on the western coast of the Malay peninsula, are the associated settlements of Malacca, or Naning, and Pulo Penang, or Prince of Wales's Island. The former of these is about 100 miles from Singapore, and 220 miles from Penang, and has an area of 1000 square miles. It is a hilly tract, with no navigable rivers, but contains some valuable tin mines, and would produce abundance of rice and pepper, timber, gums, and dyes. At one time Malacca was an important town, fostered by the famous Portuguese admiral, Albuquerque; and was, too, the scene of some of Francis Xavier's most active labours. Even in 1818, it was thought sufficiently central to be the site of the Anglo-Chinese college founded by Dr. Morrison. But its consequence and trade have gradually departed to its more successful rivals on the north and south.

Pulo Penang.—Penang is a four-sided island, having

its capital, George Town, on a point towards the mainland. A strip of the latter, extending over 140 square miles, is attached to the Government under the name of Wellesley. The importance of the whole settlement arises from the suitability of its climate to the culture of nutmegs and cloves. Extensive plantations of these spices are formed upon the island, which produces also timber and cocoa-nuts in abundance, and so many Areca-nuts that its native name is derived from the circumstance. Tin is found in its granite hills; and coffee, sugar, and cotton, are among its ordinary products. It possesses a considerable transit trade between India and the countries in its rear, and is also an emporium for British goods intended for the interior.

Penang was purchased by the East India Company in 1786, and Wellesley in 1800. Malacca, after belonging successively to the Portuguese, Dutch, and English, was finally ceded to us by Holland, with other East Indian possessions, in exchange for the British settlements in Sumatra. Singapore was purchased in 1819 at the suggestion of Sir Stamford Raffles, who discovered the value of its position during his temporary rule in Java. And very recently the Rajah of Johore has offered us for sale a hill site for a sanitorium, at the cool elevation of 5000 feet.

CHAPTER VIII.—MAURITIUS AND THE SEYCHELLES; ADEN AND PERIM.

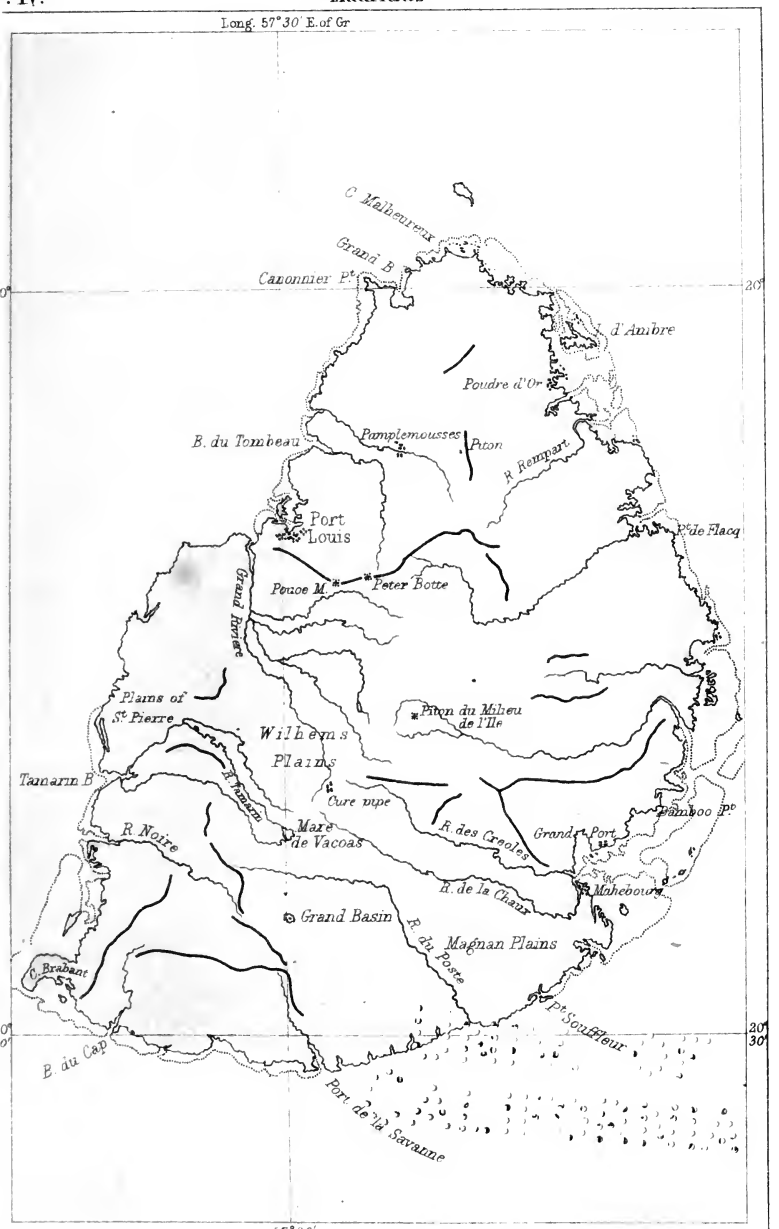
Mauritius.—General description: Port Louis; Mahébourg; Pamplemousses. Coolie Labour; **Sugar**; Trade. **The Seychelles**; Physical character; Cocoa-nuts; Turtles; other Resources.
Aden.—Position; General Outline of Natural Features. History of Capture. **Perim.**

Mauritius.

The Mauritius, or as the French still call it, the Isle of France, is situated in the Indian Ocean, about 500 miles east of Madagascar, and 70 miles north-east of Reunion. It is on the 20th parallel of south latitude, and in east longitude 57° 30′. Its western side is nearly straight, running north-east and south-west for 36 miles; and the remaining part of the coast-line forms an irregular semicircle, such that the island is 27 miles across at its greatest width. Its area is 708 square miles.

From whichever side Mauritius is approached, it appears to be composed of irregular mountains, which rise rapidly from a margin of lower land bordering the sea. In some portions of the west, this margin is very narrow, and is widest in the northern part of the island. The precipitous summits of the mountains are bare, but their flanks are much covered with timber, and contrast well with the lively green of the lower parts. The shores are girt by extensive coral reefs, on which beats a furious surf, yet leaving numerous safe entrances to the placid moat-like channels inside.

The physical character of the island is best understood by imagining a number of rugged mountains from 2000 to 3000 feet high, either quite or nearly isolated, but many of them arranged as a kind of girdle not far from the coast. Next, suppose great streams of lava poured out



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around and among these heights, filling up the interspaces to the level of about 1000 feet in the interior, but sloping and sinking to much lower elevations near the sea. The resulting fields of lava form now the winding plains, which, as Wilhems and Magnan Plains, nearly cross the island, and compose also those of St. Pierre and Pamplemousses towards the western coast. The most connected hill-ranges are the Bamboo Mountain, near the south-west shore, and another running inland from behind Port Louis.

Port Louis.—Port Louis, the capital city, is situated at the head of a capacious harbour on the north-west coast, and surrounded by an amphitheatre of basaltic hills, which enclose besides a level tract of ground large enough for holding reviews and horse-races. The most prominent of these mountains is "The Pouce," 2800 feet high, which receives its appellation from its curious *thumb*-shaped peak. The actual summit is a small flat, four feet long and fourteen broad, commanding a magnificent view of the whole island. The beautiful bay and picturesquely placed city of St. Louis; the wooded and grassed hills; the fertile plains of the centre; the mountains in clusters all round, with the white surge and deep blue ocean seen beyond them,—these are the elements of the scene. But it well repays the trouble of examination in detail. Somewhat further inland lies the yet more singular "Peter Botte Mountain," whose top rudely resembles the human form, and is only reached by a perilous passage along a narrow ridge, steeply inclined. To the south-west of the capital is the fine ravine of Grand Riviére, where the lava beds are exposed in a section 500 feet deep; and the rugged, cavernous sides of the rocky gorges are half concealed in the luxuriant vegetation of the tropics, which is fed by evaporation from the tumultuous streams below. The banks of this river are diversified also by the country residences of the upper classes in St. Louis, and the cultivation of the higher part of its basin extends to that of Wilhems Plains.

Mahébourg.—On the south-east coast is a second harbour named the Grand Port, where is the village of

Mahébourg. This is a fine sheet of water, but its entrance is incommoded by coral-reefs and islands. It is most useful during the north-west monsoon; and having been recently made a free port, Mahébourg will probably rise greatly in importance. Two small streams empty themselves into the harbour, whose steep borders present examples of all the common trees and shrubs in the island, mingled with bare rocks and cascades in front, and with forest-covered mountains in the background. The Traveller's Tree (*Urania speciosa*) is a striking feature in every landscape. Occurring in clumps, its crests of huge fan-like leaves, and bundles of white flowers, direct the thirsty traveller to the stores of limpid water which fill the hollows of its large leaf-stalks. Several species of screw-pine also attract attention by their twisted stems and bunches of aloe-shaped leaves; and one of them, named the Vacoa (*Pandanus utilis*), produces a fibre from its leaf which is largely employed for making sugar-bags. Ebony-trees (*Diospyros ebenus*) are still abundant in the forests of the less-frequented parts, while those nearer the inhabited districts contain many naturalized trees and shrubs, such as the lemon, orange, date, and avocado pear.

In the north-west of the island is the large village of Pamplemousses, in the midst of a fertile sugar district.* Except at the three places now mentioned, the population is very scattered, the labourers living on their respective plantations. These are spread over the more level parts of the country, though the neighbourhood of Pamplemousses and Wilhems Plains afford the greatest continuous breadths of sugar cultivation.

Coolie Labour.—Mauritius and Barbados are the only British colonies which did not suffer severely from the emancipation of the slaves.† In the latter island there

* A monument is erected here to the memory of "Paul and Virginia." The tragical event of the story happened on Ile d'Ambre, near the adjacent coast.

† It is not to be inferred that sooner or later a Christian nation must not manumit its slaves; but that such is the curse of slavery that it can only be safely got rid of in very exceptional cases.

were no unoccupied lands for the negroes to till on their own account; in the former, the plantation-labour was quickly supplied by immigration from India. The population in 1861 was 313,500, of whom two-thirds were coolies engaged for a stated time, usually five years. At first this engagement appears to have been little better than slavery, owing to the nefarious practices of a set of middlemen, called "crimps," residing in the island. But in 1859, new regulations of the Government destroyed this race of sharpers, and instituted a careful guardianship over the interests of the employed. The number allotted to an immigrant-ship, the food, hours of work, medical attendance on the coolies, and the education of their children and orphans, are all controlled by Government, to the great advantage of both master and labourer. To this abundance of labour, and to the great care in making good roads which has marked our rule, are mainly to be attributed the material prosperity of the island. Still, complaints are made of the high wages and the unruly conduct of the lower classes consequent upon the competition among employers for the services of negroes and coolies.

Sugar.—The production of sugar is the staple industry of Mauritius, which possesses a volcanic soil of the richest description, although it requires peculiar and skilful treatment. The land is naturally covered with blocks of lava, the undecomposed remains of ancient streams, the pieces varying from the size of a small pebble to that of a man's head. These are collected first into stone walls around the plantation, and then into parallel lines on the surface. Between them the canes are planted, and liberally supplied with guano. In time, the rows of stones decompose to a great extent, the dark basalt forming a red, powdery soil. The planters of this island have always been foremost in the introduction of improved machinery, which has induced the most satisfactory results in the saving of fuel and increased production of a finer sample of sugar. The average crop is 2,000,000 cwts. per annum, valued in the export tables at about 1*l.* per cwt.

Trade.—The total value of the imports in 1860 was

2,769,000*l.*, and of the exports 2,260,000*l.*, and these are not far from the average annual values. Of the former, guano constitutes the principal item, and comes from Peru, with some small quantities from Icaboe. Wine is the next most important article, obtained from France, whence are brought also considerable supplies of haberdashery, boots and shoes, and jewelry: of the latter, the coloured population are the largest consumers. The imports from Great Britain are equally characteristic, consisting of cotton goods, machinery and iron-ware, and coal. Wheat and other bread-stuffs are mainly obtained from Continental India, whence also are brought oils of various kinds. Cured fish is sent by the Cape, and salt-beef from that colony and from Australia. In return, the chief article exported is sugar, which is almost all sent to this country, the value of that so exported in 1860 having been 1,417,000*l.* Australia and France are the next best customers, and Madagascar receives a portion of the manufactured goods of Europe. Compared with some of the West India islands, there is very little rum exported, and that chiefly to England; although there is too much reason for believing, both from public and private reports, that a great quantity of ardent spirits is distilled in the colony.

The central position of the Mauritius in the Indian Ocean is calculated to secure a large commerce. It renders this island also well adapted to serve as a depôt for troops, from whence the Cape, India, and Australia, might be succoured in case of need. The experience of the immigrant trade shows that with due quarantine measures the health of the colony may be preserved under adverse circumstances, and the objections to a lengthened residence there, namely, the undoubted great heat, and the exposure to hurricanes, lose much of their weight if Mauritius be regarded as a half-way house where troops for India may be partially acclimatized.

Seychelles.

A number of small groups of islands and coral-reefs are dependent upon the Government of Mauritius. They lie chiefly to the north and north-east, extending to within 5° of the equator. The principal of these are the Seychelles, near east longitude 55°; and Diego Garcia, the Salomon Isles, and others near the 70th meridian. Several of these groups contain all together but a very small portion of land, and are held by one or two persons each, who employ coloured labourers to make cocoa-nut oil and catch turtle. In 1860, the total population amounted to 9000 persons, of whom only 1500 lived upon Rodrigues and the other islands, and the rest on the Seychelles.

This group consists of twenty-nine islands, of which Mahé is the chief.* The latter is 17 miles long and four wide, its granitic mountains rising picturesquely to an elevation of 2000 feet. They are all mountainous, well-wooded, and contain much fertile land. The most delicious fruits of the tropics flourish luxuriantly. Sea-island cotton was exported during the years 1817-27. Sugar and tobacco of the best quality are raised; and the clove gardens of Mahé, established by Labourdonnais, besides producing annually more spice than is gathered, furnished the seed for the valuable plantations of Zanzibar on the coast of Africa.

Cocoa-nuts.—The staple production is cocoa-nut oil; large groves of the palm lining the shores of all the islands. The process of extraction is very simple. The labourers in the woods split off the husks and shells at the rate of 500 nuts a day per man; and the kernels are then crushed at small mills worked by donkeys and mules. The oil flows thence into casks, and is ready for exportation. The annual quantity sold exceeds 300,000 gallons.

* They were explored first in 1742 by Capt. Lazare Picault, despatched by Mahé de Labourdonnais, Governor of Isle of France. They were named after Viscount Herault de Seychelles, then Minister of Marine of France. Mauritius was so called by the Dutch, in 1598, in honour of Maurice, Stadholder of the Netherlands.

Among the curiosities of the Seychelles is the Coco-de-mer, or double cocoa-nut (*Ladoicea Seychellarum*), which is even here confined to the island of Curieuse, and one, or perhaps two others. This palm requires 130 years for its development, and its fruit hangs on the tree for three years. The nuts are double, and sometimes quadruple, but are otherwise very similar to the ordinary kind. The tree supplies materials for various useful articles, of which the bonnets and baskets made from its large fan-shaped leaves are the best known. Sugar-bags manufactured from the leaves of the Vacoa form a chief article of export. And the forests furnish beautiful cabinet woods and timber of excellent quality for ship-building.

Turtles.—Tortoise-shell to the value of 1290*l.* was exported in 1859. The animal often weighs 100 lbs. and is known as the "Hawk-billed Turtle." They are caught in the day-time, during the months July—December, when they come on shore to lay their eggs. The shell is said to be detached by the cruel process of burying the turtle in the sand up to the edge of the shell and kindling a fire on its back. The "Green Turtle" is taken by night from December to March. It weighs from 200 to 300 lbs. and its flesh is worth four dollars a pound.

The geographical capabilities of the Seychelles are also very noteworthy. Their climate, though hot, is extremely equable, and seldom varies much from 82° Fah. They are situated, moreover, without the limits of the hurricane tract of Mauritius and Reunion. They possess two fine harbours, one on Isle Curieuse, and the other on the eastern side of Mahé. This is a magnificent bay, enclosed by islands, and capable of holding 300 vessels in the roadstead and five sail-of-the-line in an inner harbour. Inside of the latter is a basin, readily convertible into a wet-dock. It was named Port Victoria in 1841, and near it is a suitable spot for a town, at the comparative cool height of 1300 feet above the sea.* With the rapid increase of our commerce upon the eastern shores of Africa, this harbour of refuge will become better known and appreciated than it is at present; and the Seychelles

* McLeod.

will form a valuable colony whenever a supply of labour enables their natural resources to be developed.*

ADEN.

Aden is a small British possession, on the south-east coast of Arabia, 118 miles from the entrance to the Red Sea, situated in north latitude 12° 46′, and east longitude 45° 10′. This coast of Arabia is characterised by numerous projecting headlands, rugged and barren, generally ending in bold and lofty cliffs, or in steep slopes of loose rocks. The bays between them are occasionally capable of affording shelter to vessels. The largest of these is Kooria Mooria Bay, containing the islands of the same name, which created some interest a few years ago on account of their supposed inexhaustible beds of valuable guano. By far the best harbour is, however, that of Aden.

Physical Features.—In this case, the headland is the extremity of a peninsula, rudely oval in shape, nearly six miles long and half as broad, united to the lofty mainland by an isthmus so low that high spring-tides almost convert Aden into an island. The peninsula itself is wholly formed of volcanic matter, and the jagged ridges and peaks are arranged round three sides of it, so as to form a vast crater open to the east. Shumshum, the highest, is 1760 feet above the sea, and many other points are from 1000 to 1500 feet high. At a first glance, the whole neighbourhood of Aden looks as if composed of the heaps of cinders and slag thrown off by some gigantic smelting works. Not a tree is visible, and the rugged masses and piles of rock glow in the brightest colours under the broiling sun ; rich browns and purples are streaked with blacks and reds, and contrasted with the pure white of the sand below. A nearer acquaintance scarcely modifies the first-formed opinion of its extreme aridity.

The main ridge of mountains is nearer to the western shore. On this side it falls very steeply, and the small quantity of water furnished by the drainage runs rapidly

* See official reports in Blue Book for 1859, for an interesting account of a visit to the "Dependencies," by Commissioners from Mauritius, and by the Bishop of the diocese.

away into the sea. On the opposite, it slopes somewhat more gently towards the crater-like interior, and is, besides, broken about midway by a plateau occupying a considerable portion of the whole area. The plateau is cut by many ravines, which ultimately all unite in one, so as to enable the inhabitants of the town below to form tanks for their supply of water. The crater is about a mile and a half in diameter, and contains the town and the greater part of the cantonments for the garrison. The eastern side of this hollow is breached by a broad gap, but the opening is defended by the fortified island of Sheerah. Two other rents in its bounding walls form the north and south passes, the former of which is the only practicable communication with the mainland and with the harbour.

The "Front," or East Bay, though formerly a commodious harbour, is now nearly choked up by sand-banks, and is little frequented, except by native craft. But that on the western side, usually called "Back Bay," is a noble anchorage, capable of accommodating a large number of vessels of the heaviest burden. Its entrance is also sufficiently narrow to be easily defended. The coaling-station for the steamers running between Bombay and Suez is on this side of the peninsula, and a small village has arisen at Steamer Point. The landing-place is a broad esplanade of cinders; and when time permits, the more hardy and curious passengers proceed along the grandly picturesque road which leads to the North pass. This is a narrow defile between huge rocks of brown lava, which bristle with the guns of the fortifications. Descending on the inner side, the town and cantonments come into view. Among the rocky hills to the north-west of the town are the principal tanks, which are also often visited. The refreshing foliage of figs and acacias shades the water and is of itself a great attraction. Elsewhere, the vegetation is almost limited to the trailing stems of the caper-plant (*Capparis spinosa*), and patches of a shrubby kind of mignonette (*Reseda sp.?*) that scarcely relieve the masses of bare rock and heaps of ashes and scoriæ. The scarcity of water is the greatest drawback to this important pos-

session. The rainfall seldom exceeds seven inches per annum. The wells are not capable of giving sufficient water, and the ancient aqueduct cannot be safely repaired in the present unquiet state of the country. Recourse is therefore had to the distillation of sea-water, and reserve supplies are expected to be maintained by cleaning out all the old tanks, which at one time afforded a considerable quantity.

History of Capture.—Aden was taken by the British in the year 1837. In January of the previous year, a Madras vessel was wrecked near the town, her cargo stolen, and her crew and passengers, among whom were some ladies of rank, most barbarously treated. The East India Company demanded an indemnity for the goods, which were in part recovered from the wreckers; and obtained a bond from the Arab Sultan ruling at the place, ceding it to them in consideration of a pension of 8700$ per annum. The Sultan ultimately refused to give up either the property or the territory, endeavoured to get the English officers into his power by treachery, denied water and provisions to their vessels, and, finally, fired upon a boat and wounded some of the sailors. Further negotiation ended in a skirmish, and a sufficient force having arrived in January, 1837, the surrender of the place was demanded; which being refused, it was taken by assault, with a loss in killed and wounded of 15 British and 150 Arabs.

Its former prosperity was rapidly restored to it. From 600 persons which then lived in the greatest poverty, its population has risen to 25,000, who enjoy the advantages accruing from a passing commerce valued at a million sterling per annum.* Aden is well suited by its position to be the entrepôt for the yearly increasing trade of the adjoining coasts of Africa and Arabia, including those of the Persian Gulf. It is also a centre upon which the caravans from the interior might again converge. But as it was the diversion of the eastern traffic to the route by the Cape of Good Hope which caused its fall from its ancient greatness, so its prosperity now and in the future mainly

* No inconsiderable amount of money is left there by the passengers of the steamers calling for coals.

depends upon its relation to the great overland transit trade between Europe and India.

PERIM.

Perim is a small island, dependent upon Aden, situated in the Strait of Babel-mandeb, a mile and a half from its eastern, and 11 miles from its western shore. It is entirely of volcanic formation, and consists of long, low hills, the highest point of which is 245 feet above the sea. Northward, these merge into sandy and coral plains, sparsely covered with salsola, wild mignonette, and plants of a like habit. Loose boulders and blocks of lava, which form decomposing beds, occur at intervals over most of the remaining portion; and so porous is its surface that no springs exist on the island, and even the small garrison is supplied with water from Aden, 130 miles distant. As a possession it would be utterly worthless, except for its harbour and commanding position. The former is a mile and a half long and half a mile wide, having good anchorage-ground in from four to six fathoms of water. And while the broad passage on the African side is so difficult that with a little art it might be rendered impassable, the safe channel on the Arabian shore is reduced to a width of half a mile. So that, with impregnable fortifications hewn out of the rock, the entrance to the Red Sea would be completely barred.

The important position of this barren spot led, in 1799, to its original occupation by some Bombay troops, with a view to prevent the French from passing through the straits to India. The garrison was soon after withdrawn, and Perim was deserted even by pirates, until, with the establishment of the line of steamers from Suez, it was proposed to build a lighthouse on the island. But the French having despatched a vessel to take possession of it, in the year 1857, the authorities at Aden forestalled them by sending a small force to rehoist the British colours. And with the only good harbour in the Red Sea in the hands of France, it is no more than is due to our great commerce in those waters that we should retain possession of Perim.

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